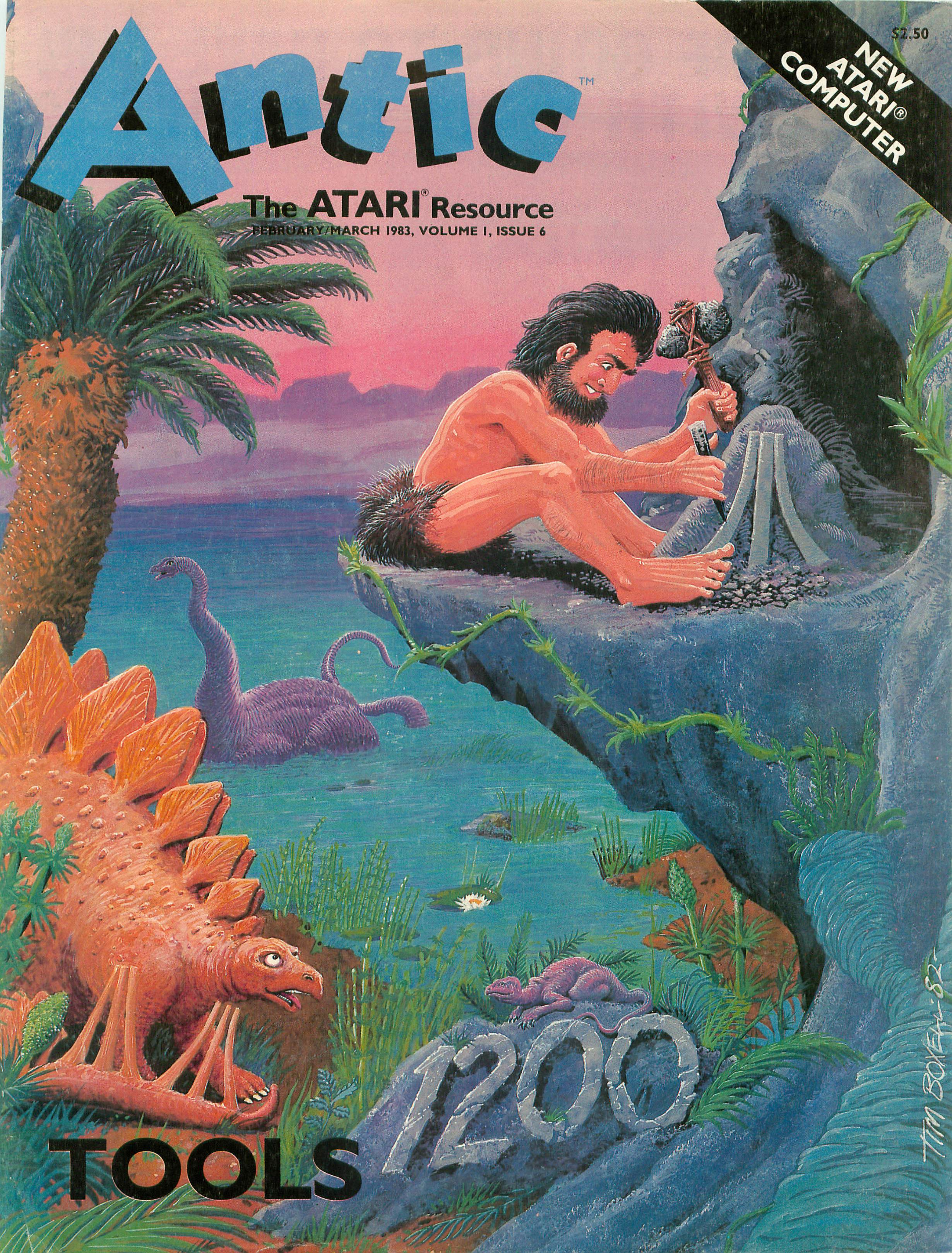
Antic™

The ATARI® Resource

FEBRUARY/MARCH 1983, VOLUME 1, ISSUE 6

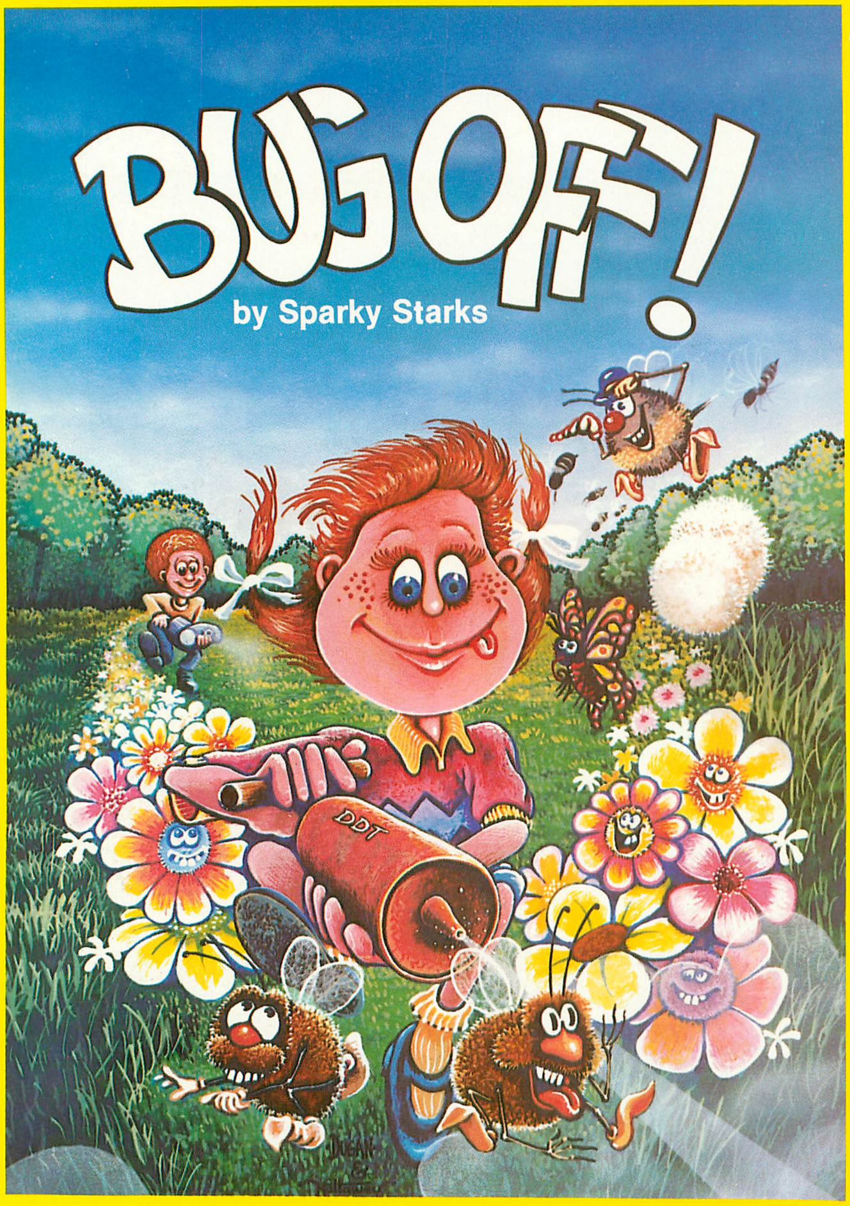
$2.50

NEW ATARI® COMPUTER



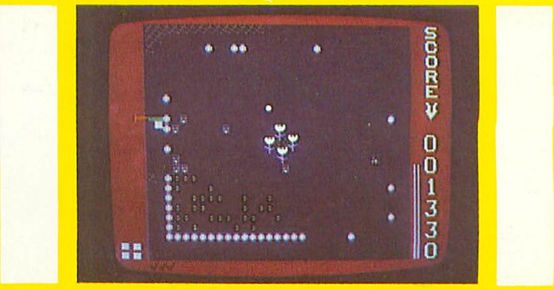
TOOLS

YOU'RE GOING TO HAVE FUN WITH YOUR ATARI!!



AND THE FUN GETS ROLLING WITH BUG OFF!

Yikes! The bugs are swarming here, there and everywhere and only a strong whiff of DDT can put 'em away. The object of the game is to control the seven different kinds of pests that are running helter-skelter over everything. The Army can airlift in more DDT to fill your bug sprayer . . . but will they make it in time?



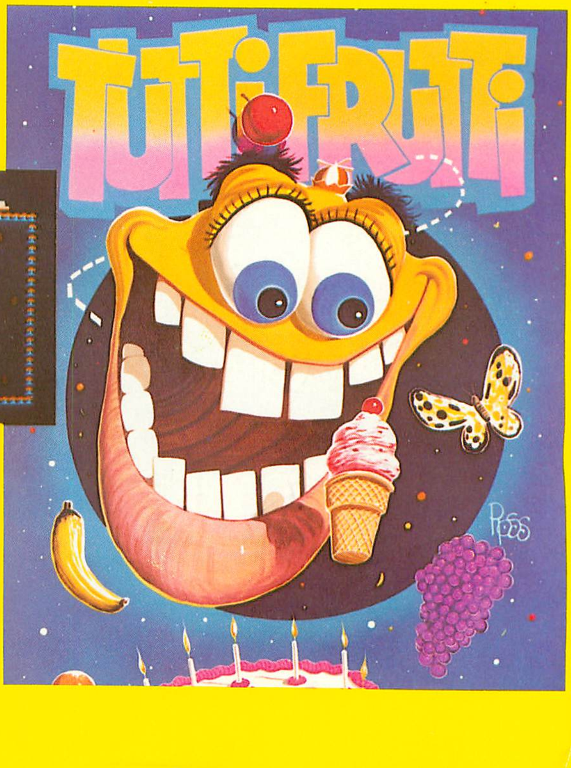
The action builds to a furious frenzy as an awesome assortment of insects attack anything and everything in sight. A definite case of "spray first and ask questions later." All this and hi-res graphics, too!

16K TAPE	050-0167	$29.95
32K DISK	052-0167	$29.95

TUTTI FRUTTI — by Alan Newman

"GRAPE FUN" FOR THE WHOLE FAMILY!

Somewhere between Never Never Land and next Thursday, there's a wild and wacky place where your joystick-controlled "Hungry" snacks on an orchard of goodies. But there are some nasty ol' bugs who'd just as soon snack on YOU, so look sharp and beware. **Fun**tastic action for all ages!



TUTTI FRUTTI . . . Wow! A crazy cast of characters in vivid hi-res color all performing in their natural habitat, otherwise known as TUTTI FRUTTI Land. Grape fun for ages 6 and up!

16K TAPE	050-0160	$24.95
32K DISK	052-0160	$24.95

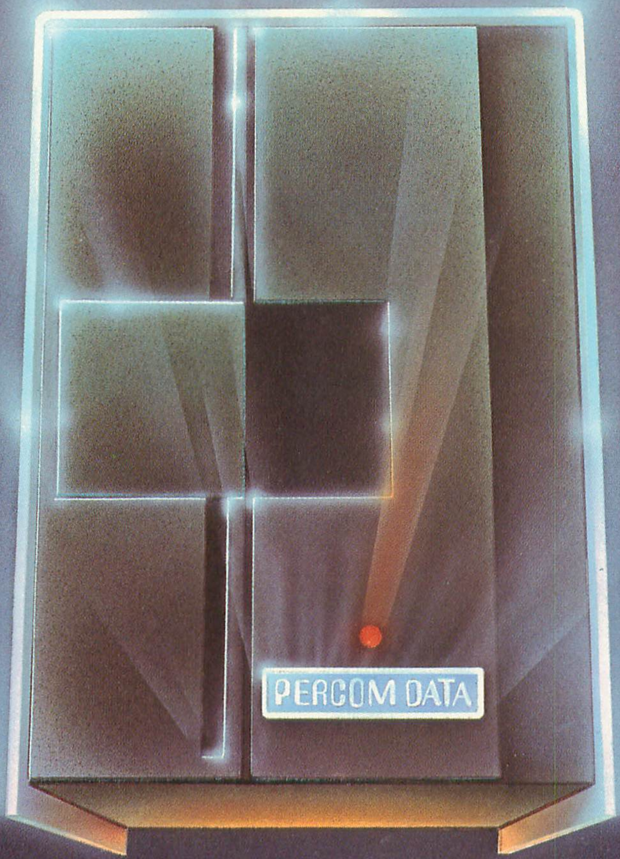


Adventure INTERNATIONAL

To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog.

Published by ADVENTURE INTERNATIONAL
a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917

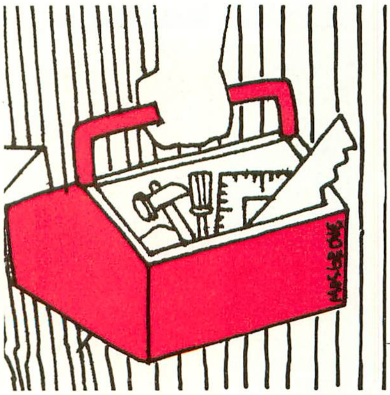
PRICES SUBJECT TO CHANGE


PERCOM DATA

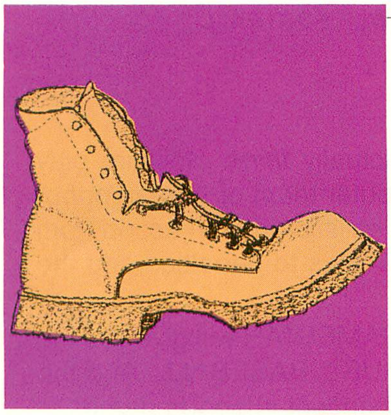
Antic™

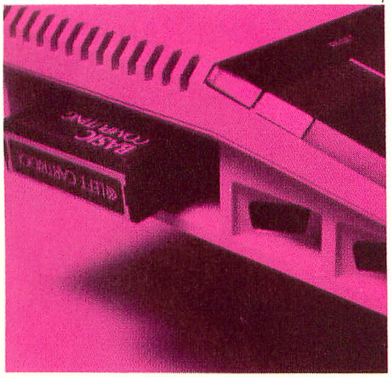
The ATARI® Resource FEB/MAR 1983, Volume 1, Number 6

FEATURES

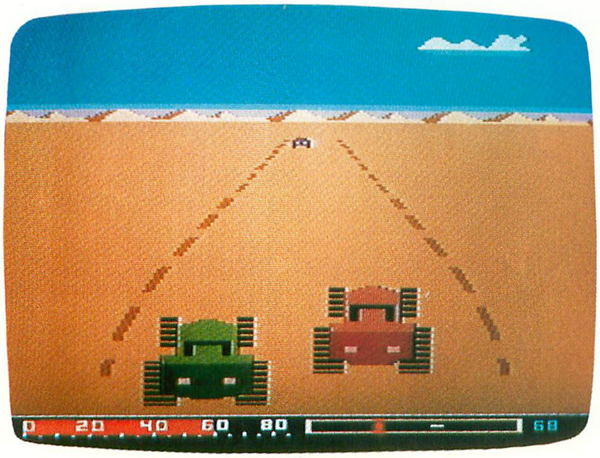


DEPARTMENTS

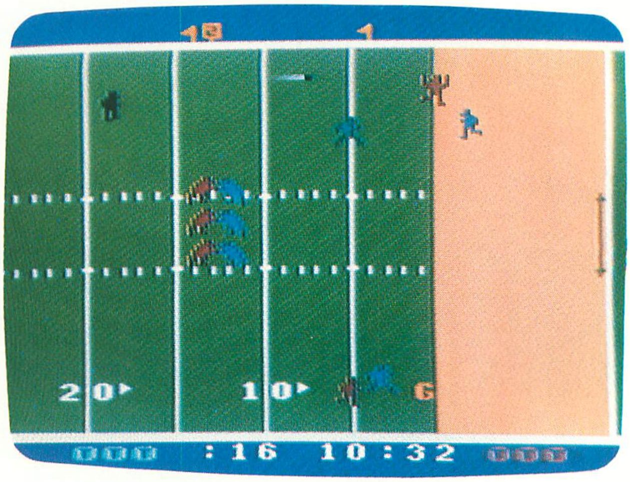




We Bring Atari® 400/800™ Sports Games Alive.



BAJA BUGGIES™



STARBOWL™ FOOTBALL

At GAMESTAR, we bring Atari® Home Computer sports games alive. With exciting, lifelike animation. Totally involving sounds. And challenging play so realistic, you'll want to cheer.

Only GAMESTAR gives you the racing excitement of BAJA BUGGIES.™ With a stunning, 3-D perspective and scrolling background. Dune buggies that drive like *real* dune buggies. And an exclusive high score/initials scoreboard, just like the arcades.

Only GAMESTAR gives you the challenge of STARBOWL™ FOOTBALL. With animated players so lifelike they actually *think.* Solitaire play against a tough computer team or human opponent. And incredibly realistic gridiron action from pass catching and fumbles to penalties and the cheer of the crowd.

And in 1983, only GAMESTAR will give you the thrills of STAR LEAGUE™ BASEBALL. And the excitement of a new concept in sports games—THE ADVENTURES OF DUTCH DOOGAN.™

Ask for GAMESTAR sports games at your nearest Atari® dealer. Or write: GAMESTAR, INC. 1302 State St. Santa Barbara, CA 93101 (805) 963-3487.

GAMESTAR

WE BRING SPORTS ALIVE.

All games available on Cassette or Diskette
for 16K minimum Atari 400/800

ANTIC
Publishing

Editor & Publisher
James Capparell

Managing Editor
Robert DeWitt

Editorial Assistant
Deborah Burns

Contributing Editors
Jon Loveless
Ken Harms
Carl Evans

Technical Consultant
Jerry White

Technical Assistant
David Duberman

Art Director
Marni Tapscott

Cover Illustration
Tim Boxell

Production Assistants
Mona Borger
Linda Tapscott

Contributing Illustrator
John Musgrove

Typesetting
Terrific Graphics

Circulation Manager
Les Torok

ANTIC is an independent periodical not affiliated in any way with Atari, Inc. ATARI is a trademark of Atari, Inc. ATARI 400 and ATARI 800 and ATARI 1200XL are trademarks of Atari, Inc. All references should be so noted.

February / March 1983,
Volume 1, Number 6
ANTIC— *The ATARI Resource is published six times per year by* **ANTIC** *Publishing. Editorial offices are located at 297 Missouri Street, San Francisco, CA 94107. Phone is (415) 864-0886. Second Class Postage pending at San Francisco, Ca. and additional mailing offices. POSTMASTER: Send address change to* **ANTIC** *297 Missouri St. San Francisco, Ca.*

Central European Distributor:
Ing. W. Hofacker GMBH
Tegernseerstrasse 18
D-8150 Holzkirchen
08024 7331

Australian Distributor:
Futuretronics
1076 Centre Road
South Oakleigh, Vic. 3167
Australia
03 579 2011

PAC ENHANCEMENT

We have enjoyed PAC INVADERS published in your August '82 issue. I have some suggestions to add to this program. Many readers may find that if "156" and "158" in lines 520 and 530 are replaced by "UJ+4" and "UJ+6", the program will make more sense.

For flashes of light occuring during the explosion, try the following:

```
change: 230 POKE 712,62:
            POSITION N,BHG:?#6;
            "          ":
            POKE712,54
        240 POKE656,3:POKE657,
            8:?"  ";SCORE;
            "          ";:
            POKE 712,0:VC$(BG,
            BG+2)=BH$:LA=0:
            POKE53278,1:SOUND
            0,0,0,0:RETURN
        250 POKE 706-TURNS,0:
            POKE 704,PEEK(710):
            VC$=BH$:FOR O=70
            TO 0 STEP -2:POKE
            712,ZZ*(O/4=INT
            (O/4)):SOUND 0,220,
            8,O/5
add:    251 ZZ=48+INT(O/10):
            NEXT O:POKE 712,0:
            GOSUB 420
```

An embellishment is to add a power pill to the display field using the fourth player. If a PAC MAN eats a power pill the game ends instantly. This avoids the feature of having unshot PAC MAN figures disappear below the "horizon".

```
change:  70 IF PEEK (53259)=1
            OR PEEK (53259)=9
            THEN 250
add:     75 IF PEEK (53255)> 0
            THEN TURNS=2:
            POKE 707,PEEK(710):
            GOTO250
        371 DIM PL3$(128):
            POKE 53259,1
        395 POKE 53251,124:
            POKE 707,14:PL3$=
            BH$:FOR LP=93 TO
            105:READ N:PL3$(LP,
            LP)=CHR$(N):
            NEXT LP
        465 DATA 24, 60, 60, 24, 0
            0,0,0,0,0,0,0,0
```

D. J. Staff & family
Rochester, N.Y.

NO MORE COPY ADS

Frontrunner Software, subject of complaints from ANTIC *readers for nondelivery of its product "Superclone," assures us that all orders are now being filled (see* ANTIC *#5 — I/O Board).*

ANTIC *here announces our immediate policy to* reject *all advertising for products primarily intended to copy software.*

Therefore, absence in ANTIC *of advertising for Superclone now may be attributed to this policy and not to failure of Frontrunner to honor its obligations.*

FLIP FLOP

I bought the "Star Raiders" and "Basketball" cartridges and am experiencing a "mirror image" with them. Occasionally, [SYSTEM RESET] fixes the basketball game, but not Star Raiders. I have exchanged the cartridges several times, but no change. Also, what do these *memory tests* you see advertised actually do?

Bruce Fuerbringer
Eau Claire, WI

Mirroring sounds like a hardware problem, possibly a slow ANTIC chip. Try the cartridges on other machines to isolate the culprit. Memory tests are of many kinds, but all verify the correct operation of RAM. —ANTIC ED

AD ASTRA

Permit me to introduce the ATARI Microcomputer Network. We are an on-the-air users' group of amateur

continued on page 9

continued from page 7

(ham) radio operators and short wave listeners who are ATARI computer enthusiasts.

We produce a bi-monthly journal known as "Ad Astra . . .", (L. "To the Stars . . ."). We have over 200 members covering the entire U.S., Canada, South America, Europe and the Far East.

Please spread the word.

Jack McKirgan II,
WD8BNG, National
Net Coordinator
Washington C.H., OH

YES, YES, YES

Does the "Model Station" (ANTIC #5) require an 850 Interface? Does the Letter Perfect cartridge (as opposed to disk) facilitate single disk-drive compatibility with Data Perfect? Is it easy to disconnect the Full-View 80 board so the computer can be used for other things?

Joe Wills
Baton Rouge, LA

Yes, the word-processing setup requires the 850 Interface for the printer. Yes, the cartridge frees the drive for other purposes. Yes, the 80-column board is easily switched for 40-column format. Other readers asked about using double-density PERCOM drives in this situation. PERCOMs work only in single-density mode when storing Letter Perfect, and Letter Perfect is the only word-processor program now compatible with the Full-View 80 board. We have had trouble formatting diskettes for Letter Perfect using PERCOM drives. Both companies are now trying to identify the problem. More later. —ANTIC ED

3-D FAN

I am very impressed with the 3-D effect of ZAXXON. I would really like to see more of it. Can you name any other games with good 3-D effects?

David Kirkpatrick
Eugene, OR

See our reviews of Way Out, by Sirius, and Baja Buggies, by Gamestar, in this issue. —ANTIC ED

GENEALOGY

We have only had our ATARI for three weeks, and your magazine has been a great help. Do you know of any software on genealogy?

James Imhulse
Cincinnati, OH

We don't, but maybe our readers do. If so, write I/O Board and we will pass on the info. —ANTIC ED

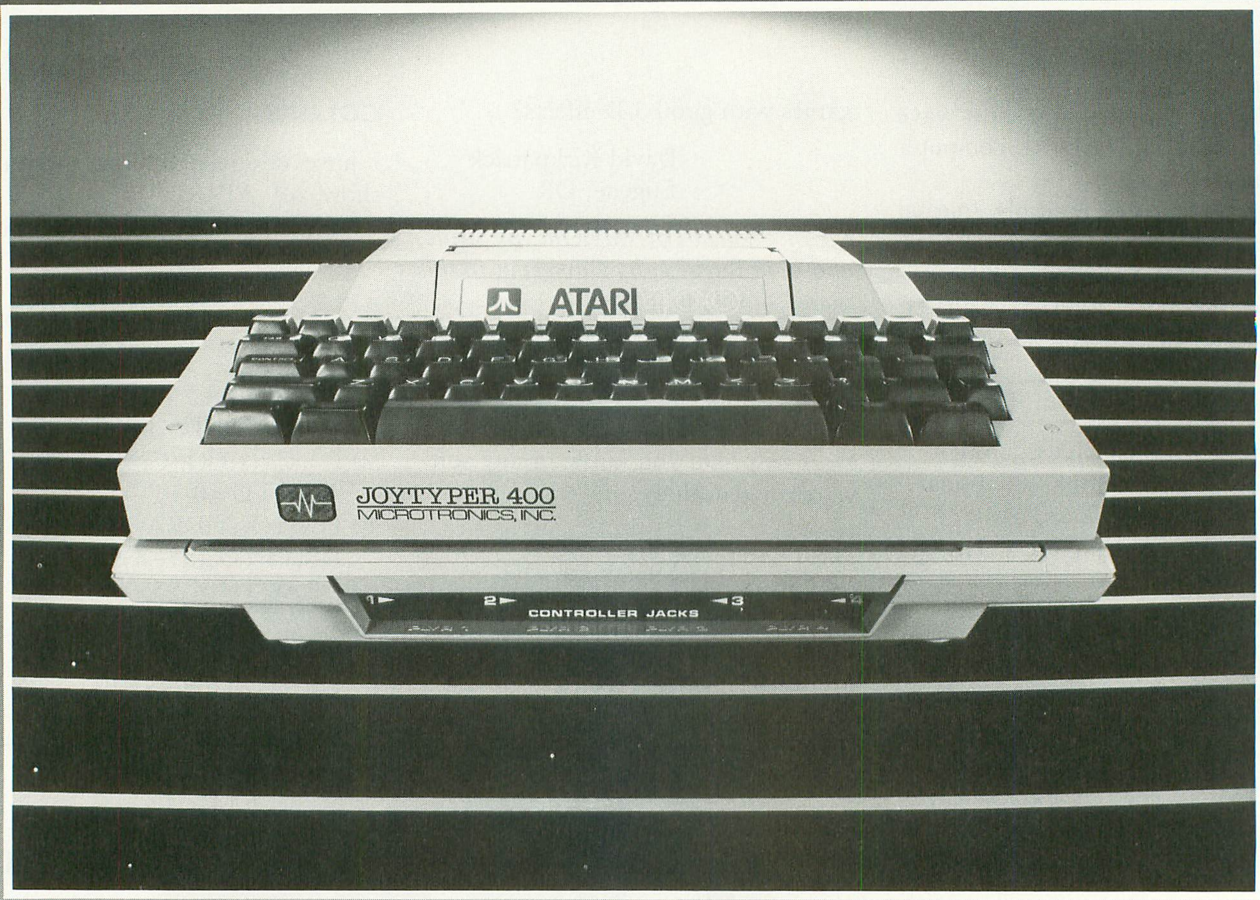
COLORS

I have designed a little program to show off ATARI's graphics. It uses Graphics Mode 7 and all of the colors.

Marc Halpern
(age 11)
Reseda, CA

```
10 GRAPHICS 7+16
20 FOR X=0 TO 159
30 C=C+1:CO. C: IF C=127
   THEN C=0
40 PLOT X,Y:DRAWTO 159-X,Y:
   DRAWTO 159-X,95-Y:
   DRAWTO X,95-Y:
   DRAWTO X,Y
50 Y=Y+2: IF Y>95 THEN Y=0
60 NEXT X: GOTO 20
```

Our New Keyboard Beats The Other Flat!



Only $129.95 Converts Your Atari 400 (And Saves Your Fingers).

Now—get the full use of your Atari 400 computer. The JOYTYPER 400 from Microtronics turns the best game machine on the market (equal to the Atari 5200) into a powerful computer as well. With the Atari 400 and the JOYTYPER 400, you can write programs, enter data and do everything else an Atari 800 can do.

THE JOYTYPER 400 is a full-stroke, standard computer keyboard housed in an attractive metal case color-matched to the Atari 400.

The JOYTYPER 400 has all the keys the Atari computers do (in the same places). The RESET key has a lower profile keycap and an extra-stiff spring to prevent accidental depression. Just unplug the membrane keyboard and plug in the JOYTYPER 400. Adhesive strips fix the keyboard to the computer.

The JOYTYPER 400 is a high-quality product backed by a 90-day warranty on materials and workmanship. Send for yours today. And put the finger on flat keyboards.!

MICROTRONICS, INC.
PO Box 8894,
Ft. Collins, CO 80525
(303) 226-0108

MASTERCHARGE • VISA
Dealer Inquires Invited

Yes—rush me ________ JOYTYPER 400's at $129.95 each plus $5.00 postage and handling.
Name ________________
Address ________________
City ________ State ______ Zip ______
Master Charge No. ________________
Visa No. ________________

ATARI 1200XL



the new computer

by LEVON MITCHELL

The newest ATARI computer, the sleek 1200XL, has made its appearance at the head of the family line. It can be used directly as a general-purpose 64K computer, or, with its new Operating System, as an upgrade to the ATARI system of hardware and software, with which it is compatible. The 1200 also offers several new features and suggests developments yet to come.

Improvements in color and sound output are probably the most notable. New chroma circuitry steps up color saturation 100% over the 400 and 800 computers. The sound capability of the POKEY chip is enhanced by the increased audio-amplifier bandwidth. There are several new special-function keys, a HELP key, a set of international characters, and a completely redefinable keyboard.

Levon Mitchell has been in the computer field for more than ten years, the last three with Atari, where he has worked on various projects for the Consumer Electronics Division and the Home Computer Division. He is now with the Special Projects Group at Atari. This material was written with the cooperation and approval of Atari, Inc.

Appearance

The 1200XL is much trimmer than its siblings, and has no doors or lids. The single cartridge slot is tucked away on the left, along with two controller ports. Ports 3 and 4 have been eliminated to allow OS flexibility, and the RF wire leading to the TV is detachable from the computer, if desired. Other connectors are the same as for the 800. The function keys have been moved to the top of the keyboard and include five new ones. The inverse-video key (formerly Atari logo) has been moved to the function-key row, which will please touch typists who were bothered by its position on the older keyboards.

The Operating System

A new 14K Operating System replaces the old 10K OS used by the 400 / 800. It supports all the legal operations of its forerunners, corrects a few known problems in these, and takes on some new roles. Most important is a fully-redefinable keyboard. This gives the astute programmer 174 new keys (including SHIFT and CTRL) to work with. The familiar set of ATARI graphics characters remains available.

The OS provides self-checking on power-up. The new HELP key allows the user to test RAM, ROM, Video and Sound output manually. The other new function keys do the following: one turns off the video display (ANTIC), allowing the user's program to run substantially faster; one disables

continued on next page

the keyboard (permitting the computer to be used for control or display purposes without accidental or malicious interruption); another disables the audible "clicks" echoing keystrokes; and the last substitutes an international character set of 29 letters (often used in non-English alphabets) for the standard graphics set. Cartridges can be inserted and removed while the machine is running, without damage to either the machine or the cartridge.

Four ANTIC modes (4, 5, 12 and 14), previously inaccessible except to the Assembly Language programmers, are supported by the new OS and will appear as additional Graphics Modes in the language cartridges. It is also now possible to program certain changes in machine parameters. For example, the automatic key-repeat rate can be speeded up or slowed down.

There are other enhancements only advanced programmers will appreciate. Some of these are: printer unit numbers in the IOCB allowing up to eight printers to be designated; display-handler improvements; and end-of-line automatically appended to the printer-handler buffer.



Hardware

The architecture of the 1200XL is similar to the 400/800. ANTIC, GTIA, POKEY and PIA are the same. The 6502 microprocessor, however, is not the same as in the 400/800. It has been improved with on-board logic drivers and the addition of a HALT line. The new machine allows the user to disable the OS and use 62K of RAM simply by toggling a bit in the PIA. However, if the ANTIC, POKEY or GTIA chips are to be used without the Operating System, the user must provide all housekeeping for the chips. There are no parallel-bus output or test points accessible to the user.

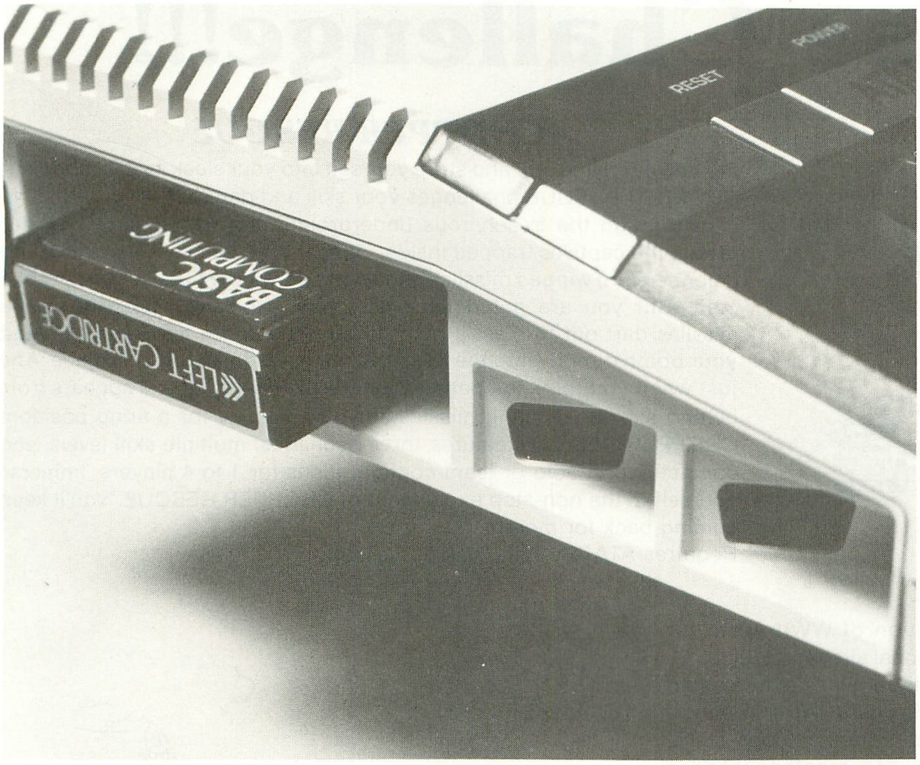
Sound – Color

The improvements in color and sound with the 1200, in my opinion, are substantially ahead of other machines in the crowded marketplace of home computers. The designers aimed for equivalence to broadcast-TV color levels, and achieved a 2:1 color saturation improvement over the 400/800. The problem of color bleeding, or overlapping, occasionally seen on the 800, has been reduced by the new circuitry.

Atari has improved the design of the sound processor (POKEY) to produce the widest frequency response available on personal computers today.

Simplicity

All of the electronics for the 1200XL



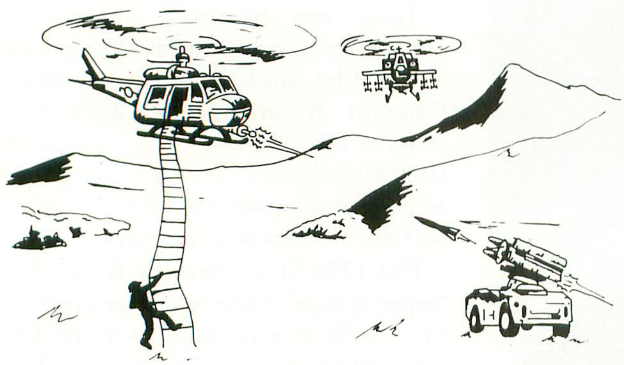
are on a single printed circuit board. The obvious advantage here is the improved reliability. There are no more insertion problems, bad connectors, or corrosion to worry about.

Three new hardware peripherals designed to match the 1200XL are also included by Atari. These are the 1010 Program Recorder, the 1025 80-column Printer, and the innovative 1020 40-column Printer / Plotter, all of which are compatible with the ATARI 400 and 800 home computers.

The 1200XL is close to being the "super system" some might be expecting. I think it is as much ahead of the competition as the 800 was in 1979. Atari has plans for a full line of new peripherals and software for the 1200 — disk drives, printers, modems, voice synthesizers, etc. I think the Atari community will be pleased with the 1200, and that it is an attractive tool for the serious programmer.

Experience the MicroProse Challenge!!!

Now On Cassette!



CHOPPER RESCUE

Zip up your flying suit and strap yourself into your sleek assault chopper: CHOPPER RESCUE challenges your skill and daring. Pilot your nimble craft through the treacherous underground labyrinth. Search out and rescue the captives trapped inside. Danger approaches from all sides as defenders fire winged missiles and sparkling energy bursts at your fragile craft. But you are not defenseless, your explosive tipped rapid-fire missiles dart out to blast a path through the dense *minefields*. Thread your bomb directly into the heart of their pulsating nuclear furnace. And just when you think the path is clear, a swift patrol drone appears from behind a ledge, spitting missles as you scramble for a firing position! CHOPPER RESCUE features three scenarios, multiple skill levels, and competition in solo or team configurations for 1 to 4 players. Immerse yourself in the non-stop excitement of CHOPPER RESCUE. You'll keep coming back for more!

Requires ATARI® 32K, Disk or Cassette . . . $29.95

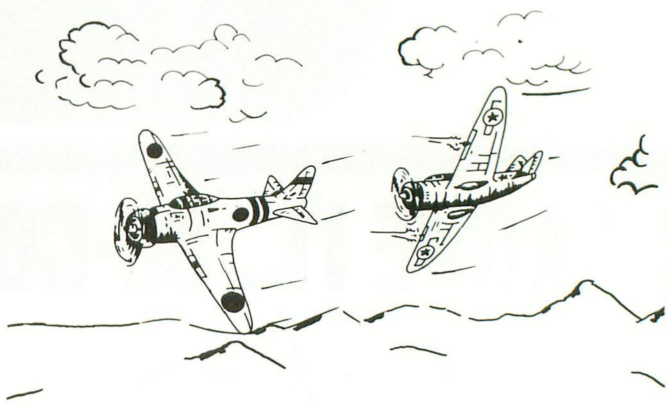
HELLCAT ACE

HELLCAT ACE is a superbly realistic re-creation of WWII Air-to-Air combat in the Pacific using a fully three-dimensional airspace. HELLCAT ACE puts you in the fighter cockpit with its unique pilot's eye view. To escape and destroy the tenacious enemy fighters, HELLCAT ACE allows you a full range of high-performance aerobatics; including loops, stalls, rolls, immellman turns, and spins. The fifteen well documented scenarios include combat air patrol, night action, and kamikazes --- and, if things get out of hand, you can bail out or attempt a water landing in your damaged fighter! HELLCAT ACE includes multiple skill levels and options for up to four players. Can you avoid being shot down and win five victories to become a HELLCAT ACE?

Requires ATARI® 40K, Disk or 32K Cassette . . . $29.95

For aerial combat challenge and excitement over Europe in WWII fly the SPITFIRE ACE!

Requires ATARI® 40K Disk or 32K Cassette . . . $29.95





FLOYD OF THE JUNGLE

Looking for a fun game you can play with your family and friends? FLOYD OF THE JUNGLE is a great game up to four people can play simultaneously! Can you be the first to guide Floyd through the jungle perils to save the lovely Janice? It isn't easy! Floyd must leap the poisonous snakes, climb the slippery vines, ride the elephants, and cross the raging rivers. FLOYD OF THE JUNGLE includes fully-animated wild animals, music, sound effects, and five different multi-color jungle adventures.

Requires ATARI® 32K, Disk or Cassette . . . $29.95

MicroProse Software is dedicated to bring you games that will challenge you far beyond the first few plays. We promise you hours of excitement and pleasure. Our games are created using "MicroProse", our own proprietary assembly language gaming system, and are available at select computer stores.

For Fast Delivery by C.O.D.,
MasterCard or Visa . . . Or
Send Check or Money Order . . .
Please add $2.50 shipping/handling.
Maryland residents add 5% tax.

PHONE: (301) 357-4739

MicroProse Software
One Caribou Court
Parkton, Maryland 21120

Dealer Inquiries Welcome!

ATARI® is a registered trademark of Atari Inc.



by BILL LUKEROTH

The ATARI Operator's Manual says you can print lower-case letters in Graphics Modes 1 and 2 by POKEing 756,226. If you've ever tried this you know that it causes the screen to fill up with yellow hearts.

The reason for this is that the lower half of the character set doesn't contain the character that represents a blank space; it was deleted to make room for the graphics symbols. The accepted cure for this condition is to follow your GRAPHICS statement with a SETCOLOR 0,0,0, which turns the hearts black to match the background. However, sentimental fool that I am, once I saw all those beautiful hearts I knew that I had to *do* something with them.

The result was the following little program, which turns the hearts red and prints "i love you" in a moving banner. You could replace my choice of words with something of your own, subject to two limitations: it must be less than 18 characters long and must be typed in lower-case letters only. If you use upper-case letters the screen will print them as *red* lower case letters (which explains the "i" in "i love you"). The program is an endless loop, so you'll have to press [RESET] to get out of it.

This Valentine's Day try surprising your special someone with the usual candlelight, soft music, *and* your newly romantic ATARI. Who knows, he or she might even decide that the computer wasn't such a bad investment after all.

```
10 REM ++++++++++++++++++++++++++++
20 REM +     VALENTINE'S DAY      +
30 REM +           BY             +
40 REM +      BILL LUKEROTH       +
60 REM +      MARTINEZ,CA         +
80 REM ++++++++++++++++++++++++++++
90 REM
100 REM REVISION 0.1,WRITTEN 10/18/82
110 REM ++++++++++++++++++++++++++
120 REM +                        +
130 REM +                        +
140 REM ++++++++++++++++++++++++++
150 REM
205 GRAPHICS 2+16
210 POKE 756,226:SETCOLOR 0,3,2:REM poin
t to lower case,color hearts red
220 FOR X=0 TO 11
225 IF X>0 THEN POSITION 1,X-1:? #6;"
                  ":REM print 18 blanks to
clear line
230 POSITION 1,X:? #6;"    i love you "
235 FOR L=1 TO 150:NEXT L:REM delay loop

240 NEXT X
250 POSITION 1,X-1:? #6;"
 ":GOTO 220:REM 18 blank spaces again
```

TEN best from APX

by JORDAN W. POWELL

If you are interested in inexpensive custom software that can help you learn about your ATARI, then you should consider programs from APX. The Atari Program Exchange is a separate company, formed by Atari to stimulate the production of programs for their computers, and there are many advantages to using it.

One big advantage for intermediate and beginning programmers is that most APX software is written in BASIC and can be studied, modified and backed up. Other software frequently costs more and is not accessible. You can learn a lot about programming and about your computer by studying and modifying programs. The following APX programs are the ten best I have encountered. I won't repeat the descriptions in the APX catalog but will reference the page number in the fall issue. If you don't have an APX catalog you can get one by calling APX at 800-538-1862 (California 800-672-1850).

The first problem I had as a disk-drive owner was in keeping track of a rapidly growing collection of files on my diskettes. The **Diskette Librarian** (p.67) was the answer. This program automatically creates a catalog of diskette files by reading your diskette directories and adding some data via the keyboard. The catalog locates those elusive programs and data files. You can search for files not only by name but by file description, type of file (basic, assembler, data, etc.), date of creation, or even by file size. Suppose you wanted to find a demo you created last month but can't remember the name. Do a catalog search for all files with the filename extender of demo, read the description of each file, and pick the one you were looking for. The Librarian will tell you which diskette it is on and will even run the demo for you if you would like. Also, you can learn about disk I/O and screen formatting, from reading the Librarian program. Suggested modifications include: adding an option to print diskette labels; expanding the size of the date field to eight characters; adding an option to go directly to DOS; and adding an option to print the catalog.

One of the most useful applications yet found for computers is the data base. A data base is a collection of information together with some method of adding and retrieving information from the collection. The **Data Base Report System** (p.12) is such a system. A simple use of this program would be to keep a list of credit cards and appliance serial numbers in case of loss or theft. A more sophisticated use could be a birthday/anniversary data base. You could store names and dates along with gift preferences. This APX data base has a somewhat limited search capability but it is the best inexpensive way I have found to learn about data bases. Some ideas for using a data base are: stamp and coin collection catalog, coupon file, magazine article or literature index, property inventory for insurance purposes, addresses and phone numbers (if the list is sufficiently long) or a ham-radio log. This product is also instructive about the creation of records on disk, screen formatting, and passing control between programs.

You've undoubtedly heard about the GTIA chip and you may be wondering just what it can really do. The **GTIA Demo Diskette** (p.73) will show you, if you have the GTIA chip in your computer (see ANTIC #2). Watching the demo is the best way to understand the three new graphics modes provided by the GTIA. The documentation contains an excerpt from the book *De Re ATARI*, and there is a brief discussion of three of the programs on the diskette.

Getting control of your life probably involves getting control of your money. **Family Cash Flow** (p.10) can help. Enter information on your income and expenses and the program generates reports, both summarized and detailed, on exactly where your money is coming from and going. If you've never taken a good look at your cash flow you're probably in for a surprise. Learn about "user-friendly" programs from this one. User-friendly means that the program requires you to know little about handling the program itself so you can concentrate on the problem you are using the program to solve. The program accomplishes friendliness through the clever use of menus.

BLIS (p.71) is a program that prints other BASIC programs in an easily readable format. Most BASIC programs are compressed to save memory. Unfortunately, this makes them very hard to read. BLIS will help you read BASIC programs, to learn from or modify them. You will have to modify this pro-

gram in order to use printers other than ATARI (Centronics) because they use different control codes.

Eastern Front 1941 (p.42) is a game masterpiece, a brilliant simulation of battle conditions on the eastern front in WW II. You are the general in charge of the German invasion of Russia in 1942. You also command individual units in tactical battles. The game is played on a scrolling map which, while changing with the seasons, graphically conveys information about the terrain, unit positions and strengths, supply lines and troop movements. This game is written in Assembler and the source code is available as a separate product (p.43), useful for study. Would-be game programmers can learn a great deal about game engineering from this program.

Snark Hunt (p.38) is a game of logical deduction. You are given the simple rules of behavior of vorpal beams as you shoot them into a grid. By their behavior you must determine the whereabouts of the hidden snarks. Don't be fooled by this seeming child's game. Techniques similar to this were used in deducing the structure of DNA. This game, though a bit noisy, is absorbing and fun to play. Reading the BASIC code offers information on the use of sound, the joysticks, color, alternate character sets and BASIC graphics.

To show off ATARI's musical capabilities you need **Jukebox #1** (p.51). This is the best ATARI music-playing program I've ever heard; it has actually increased my interest in learning about music. As a demonstration to impress friends it is a sure thing. This diskette was created using Advanced Music System (p.21) and can be used to see what that program can really do.

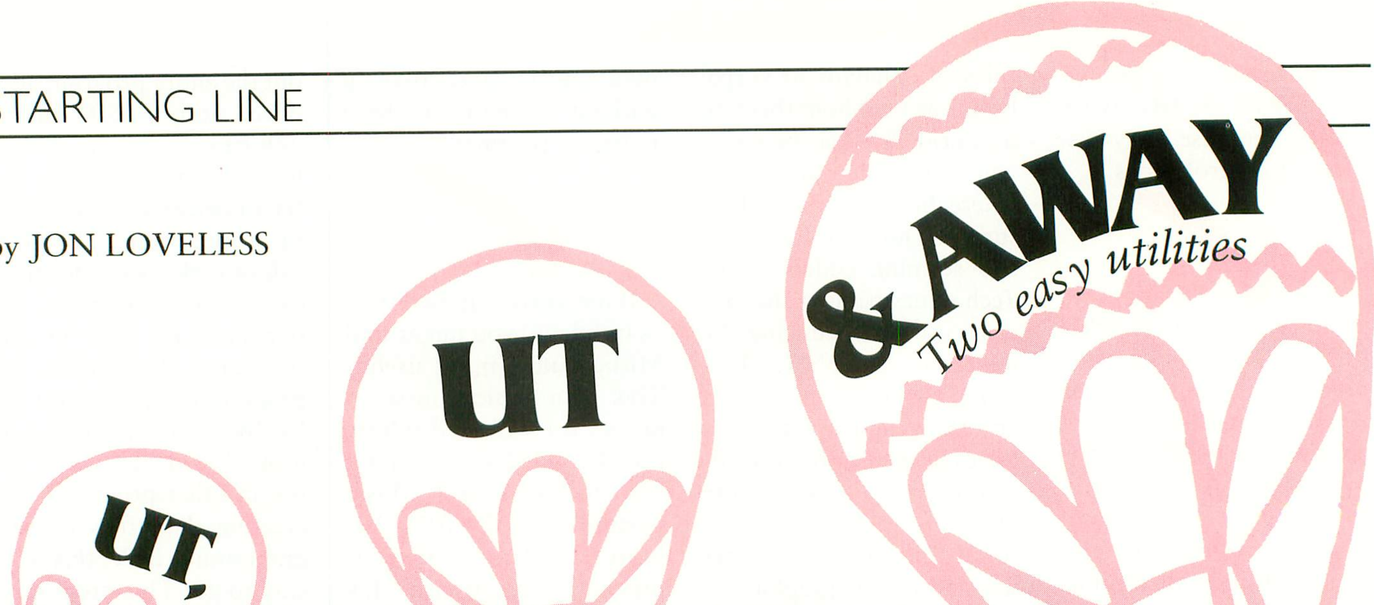
You won't get musical quality out of the ATARI's tone generators, but if you learn about music you'll be able to actually write your own music and play it without having to master a musical instrument.

If the music bug bites you as it did me, you might find **Music Tutor** (p.34) useful. This is a basic course in music. You will need at least the knowledge presented here to use Atari's Music Composer or the APX Advanced Music System previously mentioned. It's more fun than reading a book on the subject. Be sure you load it exactly as the instructions tell you.

The **Atari Program Text Editor** (p.62) is a powerful microcomputer tool. It has many features found on large mainframe text editors. Suppose you wanted to find a particular POKE in a BASIC program; instead of getting bleary-eyed searching through the code you have merely to enter a short search command and it will find your POKE for you. If you want to change a variable name, you can change it throughout the entire program all at once. Atari BASIC has an unfortunate bug in that it locks up the machine if you try to delete too many lines of a program. The Text Editor makes such deletions easy. You can copy part of one program into another or create a file with part of a program in it, then you can build a new program around it or just save it for use in other programs. For creating data files or program source code, this is the way to go. This program is very good and useful but the manual sometimes is hard to understand. Once you learn and use the Text Editor you'll never want to be without it.

I hope I've given you some ideas which will enhance your enjoyment of your ATARI computer. I've found this APX software both useful and educational.

APX actively solicits software written by ATARI users, publishes it and pays royalties to the writers. Perhaps we will see your programs there some day.



UT, UT & AWAY

Two easy utilities

by JON LOVELESS

If you are one of those who found an ATARI under your Christmas tree, welcome to ANTIC, and, I suppose, welcome to the world of computers. This regular column is designed to help you ease into computing with a minimum of intimidation.

Many people find the ATARI, or any computer, a fearsome and complicated piece of equipment. You may be encouraged to know that it is not so much the computer that you should be leary of, but the jargon. Bits and bytes, RAM and ROM, OS and DOS, are all new terms, very strange and confusing. Even the theme of this issue of ANTIC is a bit (pardon the pun) forbidding. By the time you have given these pages a fair reading, however, you may realize that there is hope that even you can understand this computer business.

So, let's explore our theme topic a little. We have decided to give you a taste of what are known broadly as "utilities." Utilities are computer programs that make life easier for the computer operator or programmer.

Many people think that only programmers use these utilities, and as a result they are not quite sure they want to get into it. Programmers *do* use utilitites, and many write their own to make the job of writing other programs easier, faster, and more efficient, or just plain fun. If you can turn on your computer and do something other than run a commercial program, then *you are* a programmer (though perhaps not yet proficient). Chances are that you already need, want and should have utilties to help you along.

One of the best ways to learn your ATARI is to fiddle around with utilities, and sooner or later you will write your own. If you have a disk drive and a diskette with some DOS files on it, type in this short routine which will illustrate my point:

```
10 REM ** DISK DIRECTORY FROM BASIC **
20 DIM TITLE$ (20)
30 OPEN #1, 6, 0, "D1:*.*"
40 INPUT #1, TITLE 1
50 PRINT TITLE$
60 IF TITLE$ (5,8) = "FREE" THEN END
70 GOTO 40
```

```
ALLOW 20 CHARACTERS
OPEN THE DIRECTORY
GET THE FIRST NAME
PRINT IT
STOP WHEN DONE
GO GET ANOTHER
```

explanation of program

Run this program and behold the magic of a utility! Before your very eyes the contents of the disk in drive #1 will be displayed on the screen. This, of course, assumes that you are not using a disk from one of the many software manufacturers, but an ordinary, formatted disk that has been used. This program allows you to see what's on a disk without having to resort to the DOS menu.

As you may know, when you load DOS into memory, it not only takes a few seconds, but it also normally wipes out your BASIC program. You can change the PRINT in LINE 50 to LPRINT and the information will be printed out on your printer. This routine, then, is useful, time-saving and definitely qualifies as a utility.

Here is another utility, or rather, the beginning of a utility, that will allow you to test and demonstrate the screen-editing of the ATARI. It simply accepts characters from the keyboard and prints them on the screen, but in so doing, it also accepts the screen-editing features built into the keyboard.

```
10 REM ** SCREEN TEXT EDITOR **
20 PRINT CHR1 (125)
30 OPEN #1, 4, 0, "K:"
40 GET#1, A
50 IF A = 27 THEN END
60 PRINT CHR1 (A); :GOTO 40
```

```
CLEAR THE SCREEN
GET THE KEYBOARD READY
READ A KEY-PRESS, CALL IT "A"
```

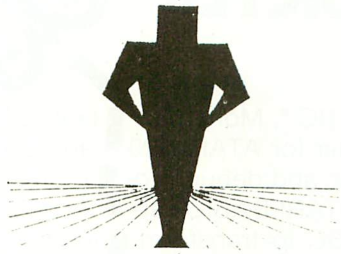
explanation of program

continued on page 20

Jon Loveless is a contributing editor of ANTIC and Vice President of Marketing for Synapse Software.

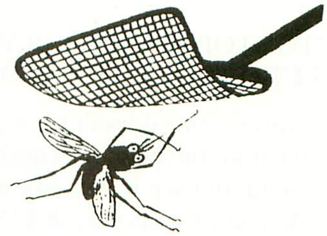
NEW FOR ATARI FROM MMG MICRO SOFTWARE

NOW — THE TWO MOST POWERFUL AIDS FOR ATARI BASIC!!



BASIC COMMANDER

- **Single key entry file commands**
  - — ENTER "D:
  - — SAVE "D:
  - — LIST "D:
  - — RUN "D:
  - — LOAD "D:
- **Single Key DOS functions from BASIC**
  - — FORMAT a disk
  - — LOCK a file
  - — RENAME a file
  - — UNLOCK a file
  - — DELETE a file
  - — DISK DIRECTORY
- **THREE PROGRAMMABLE KEYS!!**
  - — single keys programmed for your own use, even whole subroutines
- **AUTONUMBER**
  - — automatically generates line numbers for you — speeds program entry 25-75%
- **BLOCK DELETE**
  - — deletes any range of lines instantaneously!
- **RENUMBER**
  - — renumbers lines and all references
  - — extensive error trapping
  - — 3 seconds to renumber 500 lines



MMG BASIC DEBUGGER

- **TRACE through your Basic program**
  - — Single step
  - — TRACE while
  - — TRACE UNTIL
  - — change variables
  - — LIST line numbers executed
  - — examine variables' values
- **Full screen BASIC editing**
  - — scroll up or down by cursor
  - — edit your whole program easily
  - — no more LIST line number ranges
- **Split screen mode**
  - — view two parts of your BASIC program at once, and edit both!
  - — scroll each window independently
- **CROSS REFERENCE**
  - — provides a list of variables and the line numbers in which they are used in your program
- **SEARCH FOR PHRASE**
  - — search your BASIC program for any phrase, command or string of characters; let your computer do the searching for you!

EACH PRODUCT ALONE REQUIRES 16K, AND IS AVAILABLE ON DISK FOR *ONLY $34.95*

Now, the convenience of both powerful utilities together in your Atari *at once*

The Combined Basic Commander and MMG Basic Debugger requires 24K. $74.95

ADDITIONAL PRODUCTS

NECESSITIES

RAM TEST II - The fastest and most thorough memory test available for the ATARI has now been further improved! Tests not only all locations, but also tests the memory addressing system. This all machine language program takes 4 minutes to test 48K. It's the only program that tests the cartridge area of RAM. Good for new 400/800 computer owners, for testing new RAM boards and for use in computer stores to test and pinpoint bad memory locations. Bad memory locations are pinpointed so repair is as simple as replacing a chip!

Requires 8K, Disk or Cassette **$29.95**

DISK COMMANDER II - Just save this program on your BASIC disks and it will autoboat and automatically list all programs for the disk into your screen. Simply run any program by typing a single number.

Requires 16K, Disk Only **$29.95**

TUTORIALS

ASTEROID MINERS - This 50 page book and program provides for a unique intermediate to advanced tutorial. A 32K BASIC game utilizing over 25 players in player-missle graphics, machine language subroutines, a redefined character set, multiprocessing utilizing the vertical blank interrupt interval, and much more! The 50 page book included with the program documents each part of the entire program and contains the fully documented source code for both the BASIC and assembly language parts of the program. Use these routines in your own programs. These examples make it easy!

Requires 32K, Disk or Cassette **$34.95**

GAMES

CHOMPER - An all machine language arcade style game with intelligent monsters. Requires 16K Ram, 1 Joystick and nerves of steel.

Available on Disk or Cassette **$29.95**

BUSINESS/HOME

MAILING LIST - Extremely fast BASIC and machine language program. Each data disk holds over 500 files. Sort on any of 6 fields at machine langugage speed or search on any fragment of a field! Use any size labels or envelopes.

Require 40K, Disk Only **$39.95**

NEW

MMG DATA MANAGER - If you frequently find yourself looking for something, only to find it eventually right under your nose, then MMG DATA MANAGER is for you. Organize virtually anything into a computer-searchable format, and let your ATARI do the hunting for you. MMG DATA MANAGER is the first of a series of business applications from MMG MICRO SOFTWARE, all of which will share the ability to access files created by any of them. This flexible database manager will allow many fields, with machine language sorting, on any field. In addition, you have total control of the structure of your data, allowing you to design a database which you feel most comfortable. A special feature of MMG DATA MANAGER is its ability to select for a given value of any single field, or any combination of values from many fields. You could, for instance, determine who lived in Las Vegas, Nevada, and bought item #3145 from you, and whose last name began with SM, and whose telephone number began with (702) 873-4. You'll never lose track of information again! Multiple print options add to the versatility of MMG DATA MANAGER.

Requires 40K, Disk Only **$49.95**

Available At Your Favorite Computer Store

OR Send a Check or Money Order to:

MMG MICRO SOFTWARE

P.O. Box 131 • Marlboro, NJ 07746

OR CALL

(201) 431-3472

For MasterCard, Visa or COD Deliveries

(Please Add $3.00 For Postage & Handling)

NJ RESIDENTS ADD 5% FOR SALES TAX

STARTING LINE

continued from page 18

PRESS [ESC] TO STOP THE PROGRAM
PRINT THE LETTER AND GET ANOTHER

In its present form, this routine doesn't have a practical use other than to demonstrate the keyboard and to whet your appetite. Fiddle around and see if you can make it into a full-blown utility. As a starting point, in LINE 50, rather than END you could have the program do something else. Or, in LINE 60 you could again replace the PRINT with LPRINT and have a crude typewriter. Use your imagination, keep it to 20 lines or fewer and send it in to me at ANTIC. We will publish the best expansion of this shortie in a future issue, and make you famous!

I hope that this has lightened the burden that usually plagues the new computer owner. Remember that utilities are not magical, they are helpful. One line routines that make your ATARI easier to use are as much a utility as the professional programmer's character generator.

Above all, learn about your machine by playing with it rather than working with it. You will find it very responsive, quite patient, but very exacting. The pages of ANTIC will help you as you learn.

PRONTO bank on your atari

by DEBORAH BURNS

Soon you may be able to use the ATARI to do your banking without ever leaving home. A pilot electronic banking program called PRONTO was started last year by The Chemical Bank of New York for some of its customers who owned ATARIs, and is now being licensed to many more banks across the country. Crocker National Bank in San Francisco, Worthen Bank in Little Rock, and Florida National Bank in Jacksonville are just a few of the other financial institutions that have opted to use PRONTO for a test run in 1983.

The model program that began in New York served 200 customers of Chemical Bank willing to participate in this experiment. PRONTO is an extension of other electronic banking services offered by the bank that has included a corporate cash-management system and computer-automated tellers.

To begin using PRONTO, a customer needs to own an ATARI computer, a standard telephone line and a modem. Each home computer system serves as a "terminal" for the main program that runs on Tandem Computers at Chemical Bank headquarters. The user connects with the main system by dialing a local network number for the bank via phone and modem to begin transactions on a home video screen.

When the first test run began last November, PRONTO customers had to use an acoustic-coupled modem to transmit and receive data. This type of modem has two foam "cups" into which the earpiece and mouthpiece of a standard telephone are placed. Customers used the ATARI 830 (acoustic-coupled) Modem along with the ATARI 850 Interface device and a special cartridge to activate the program. The long-awaited 835 (direct-connect) Modem for the ATARI was not available at the time, but should be soon.

Direct-connect modems are more advanced and much easier to use, and will eventually replace all acoustic-coupled types. The ATARI 830 Modem connects directly with a telephone wall-jack or plugs into the telephone with a "Y" adapter. Most software communications systems that use a modem also require extra software such as TELELINK. The PRONTO system includes a communications-software cartridge, similar to TELELINK, that is supplied to the user at no extra cost.

The PRONTO software is a complete financial management system that allows you to get instant information about your bank account. It also provides screens with forms for household budgets. You may register checks, pay bills, send electronic mail to other PRONTO users and keep accurate tax records that include principal and interest categories. The budget screens allow you to list up to 50 items and five different personal budgets per household. Each family member can have a secret access code to insure privacy. You may monitor all your account activities and get an "electronic statement" along with your usual monthly printed statement.

Most people who were asked to participate in this project responded enthusiastically. In San Francisco, Crocker Bank announced to its employees and the general public that it was looking for participants to begin the PRONTO pilot in early 1983. The fifty openings for test users at Crocker were filled immediately. A total of 200 customers and employees are expected to be using the PRONTO pilot in San Francisco by July. Many users of the Crocker system will have the option of using other hardware, such as the IBM PC or the Apple II.

The banks have not yet determined how much to charge for PRONTO, but when Chemical Bank queried its pilot customers, most agreed that they would be willing to pay about $10 a month for this servcie. If you feel that you may be interested in this type of service, ask your own bank. Who knows? It may be offering electronic banking like PRONTO in the very near future.

ULTRA SOUND

by THOMAS KRISCHAN

Imagine sitting in your easy chair in front of the color television set with a stereo speaker to your right and left. The Star Raiders cartridge is in the computer. After selecting your destination you press "H". A slight rumble emanates from the speakers as the engines engage. From the forward view, you see the stars moving faster and faster towards you as the sound increases to a roar. You explode into hyperwarp and the sound from the speakers rattles your chair. RED ALERT! You reach for the joystick to direct your photons but it's too late! You receive a direct hit from Zylon fire. The room echos from the impact, the vibration causes little nick-nacks to fall from the cabinet shelves. DAMAGE CONTROL. You can hear the cries of your injured crew reverberating through your star cruiser. No, its your neighbors yelling for you to turn down your stereo. What excitement! Maybe next time you should use the head sets.

Tom Krischan is Chief Executive Officer of Technimetrics Computer Consulting, West Allis, Wisc., manufacturers of a variety of computer accessories.

Table 1. List of Components.

Item	Distributor	Price	Comments
5-Pin Audio/Video Plug	Radio Shack (#274-003) APX (#90002;$2.49)	$1.49	Shielded
RCA Type Phone Plug	Radio Shack (#274-339)	$1.39	Shielded
10 Ft. PVC Insulated Cable	Ask Local Electrician	$4.61	0.25" O.D., shielded 2AWG 10-12 conductor
	Total	$7.49	

You can make a simple, inexpensive cable that will channel audio from your ATARI 800 to your stereo speakers. This article will show you how.

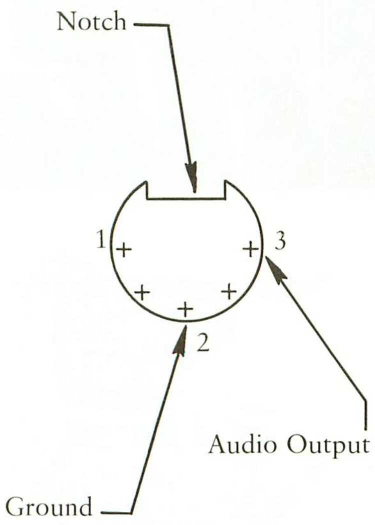
The cable will attach to most stereo systems or radios. Unfortunately, the other end will only attach to an ATARI 800 computer, where the monitor is external. The ATARI 400 would require disassembly, interior soldering and case modifications. There are three components that you need to buy. We have listed these items, their approximate cost, a possible distributor and comments in Table 1.

The 5-Pin Audio/Video Plug is sometimes called a 5-Pin DIN plug. The outer jacket can be made of plastic ($1.49) or metal ($2.49). It contains five small pins mounted through an insulator panel and arranged in a 180-degree arc. There is a small notch at the top for alignment purposes (Figure 1.)

One side of the insulator panel usually has small numbers printed on the board. These numbers correspond with the numbers in Figure 1. For our purposes, it is important to know that the ATARI 800 uses pin #3 as the audio output and pin #2 as the ground. The RCA-type phono plug has an outer jacket of metal. The inner workings contain one large pin held in place by insulation. These units are usually sold in pairs since the typical use is for a two channel stereo input. The large pin is the audio input and the outer jacket is the ground.

PVC insulated cable is sometimes called telephone cable. There are hundreds of different types of cables to choose from. We recommend a tinned

Figure 1.
5-Pin Audio/Video plug configuration
(outer facing side)



copper, PVC insulated, conductor cable with 22–24 AWG stranded drain wire. Wire gauges much larger than 22 (i.e. 18, 16, 14 . . .) are very stiff and difficult to work with. Stranded wire should be color coded. The cable should be jacketed in a chrome PVC with an outer dimension (O.D.) of 0.25 inches to ensure a snug fit with our plugs. If you choose a smaller cable (eg. speaker wire) you run the risk of pulling the wires out of the plugs or crimping the cable when you move the computer. If you have your computer in an area of severe electrical interference, we suggest that you purchase a cable with aluminum-polyester shielding. The minimum length for your cable should be ten feet to allow for some flexibility in where you can place your components.

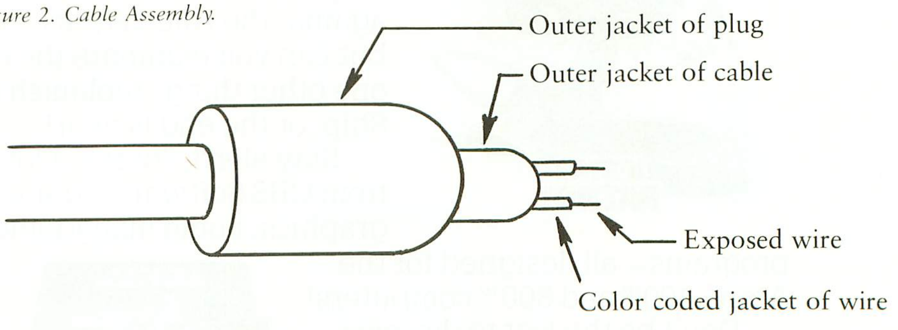
Next, gather the necessary tools for soldering. You will need a pencil-tip soldering iron with a heating element of 25 to 35 watts. The best solder for this application is an alloy of 40% tin and 60% lead with a resin flux core. This is sometimes referred to as television or electrical repair solder. In addition, you will need a razor, a needle-nose pliers, a wire cutter, a clampable heat sink and a clean, well-lighted work area. Remove the outer jacket from each plug and slide the jackets onto opposite ends of the cable. With a razor, carefully strip away ¾″ of the PVC cable cover from each of the cable ends. If your cable contains more than two color-coded wires, snip off the extra ones to make them flush with the PVC cable cover. Compare the ends of the cable side-by-side to make certain that the color codes are an exact match. Strip away ¼″ of the color-coded PVC from each wire (Figure 2). You are now ready to solder.

Hold the inner workings of the plugs with a pliers and attach the heat sinks to the appropriate areas. Solder ground to ground and audio to audio. If the insulators begin to melt, discontinue soldering and attempt to re-straighten the pins. Once soldered, reassemble the plugs. Firmly insert the 5-pin plug into the ATARI 800 monitor jack and the RCA-type phone plug into the accessory or tape (in) jack on the back of your stereo. Boot something musical onto your 800, turn down the volume on your TV and switch your stereo to accessory or tape. If you have a stereo/mono switch, place the switch in mono position. Otherwise, the sound will only come through one speaker. Very slowly, turn up the volume. You should hear perfectly clean music. If you hear a hum, you have a poor connection. Check that your solder has not bridged across the insulator.

For the adventurous experimentor, you could also build a frequency separator making this a pseudo stereo rather than a monotone cable. Use a high/low frequency shunt and patch the high frequency to one channel and the low frequency to the other. I'll leave the design up to your imagination. In addition, the strength of the audio signal could be monitored and used to control some other devices. For example, you could place a fan on the top of your television and an inclinator platform beneath your chair. As you enter hyperwarp, the fan would blow faster and faster, and you would gently sink back into your seat. The seat would jolt whenever you were hit by enemy fire and it would pulse during engine damage. An affixed 'Le Stick' on the arm of your chair would allow you to bank to the right or left, climb or dive, by shifting your weight. The ultimate in home aviation simulators!

If you live on an island atoll and have no access to parts or are scared to death by the sight of a soldering iron, send me $24.95 for an assembled and tested audio cable. Otherwise, build it yourself and save a few bucks.

Figure 2. Cable Assembly.

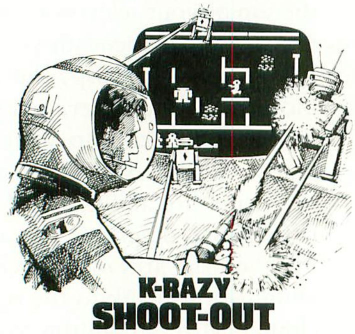


CBS introduces

FASTWARE™

Get ready fast for CBS Software! Fast-action games and a lot more! So fast, you'll call it "fastware"!





You gotta be fast at K-RAZY ANTIKS™! If the carnivorous ants don't get you, their exploding eggs might. As you're defending your way through this multi-level maze game, watch out for the hungry anteater's sticky tongue and the flooding rainstorm, too!

Are your reflexes fast enough for K-RAZY SHOOT-OUT™? You be the judge. If you have terrific marksmanship, you can blast through the evil Alien Droids. But only if you're really sharp will you be able to avoid the radioactive walls and escape their deadly Control Sectors.



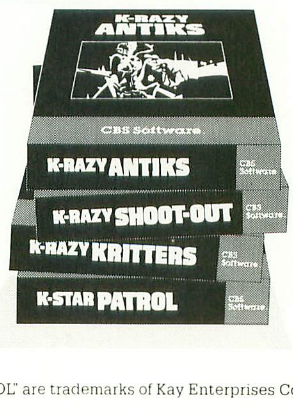
You're in charge of the Command Ship in K-RAZY KRITTERS.™ But it will take fast thinking to blast the invading alien attackers to save your Star Base from impending doom. Fail, and face the consequences—as your Command Ship is carted off to the intergalactic junkyard!



As lead pilot of the K-STAR PATROL™, you're the Star Ship's only hope. Maybe you can defend against the Alien Attack Forces, but can you eliminate the intergalactic leeches, too? Oh, and one other thing: replenish the Force Field Energy of the Star Ship, or the end is near!

Stay alert! There's a lot more excitement coming fast from CBS Software—games, tutorial education, graphics, home management and personal management programs—all designed for the Atari® 400™ and 800™ computers!

Don't be the last to discover CBS Software. Be fast!



CBS Software

A unit of CBS Inc., 51 W. 52nd St., New York, NY 10019

"Atari," "Atari 400" and "Atari 800" are trademarks of Atari, Inc.
"K-RAZY ANTIKS," "K-RAZY SHOOT-OUT," "K-RAZY KRITTERS" and "K-STAR PATROL" are trademarks of Kay Enterprises Co. © CBS Inc. 1982

TOOL BOX



by JERRY WHITE

Utility programs are the programmer's toolbox. Any job becomes easier when you have the right tools. If you will be writing programs using Atari BASIC or Assembly Language, you may benefit from some of my favorites.

I will briefly describe the various software utility products I have found most useful. But before we talk about software, let's define what I consider to be the minimum hardware configuration required for serious software development on ATARI 400 and 800 computers. Yes, you *can* write programs on an 8K computer, but many of the most useful utility packages require a minimum of 32K RAM and one disk drive. I use an 800 with 48K, two 810 Disk Drives, an 850 Interface, an EPSON MX-80 printer, an AXLON RAMDISK, and a few other goodies. Although all of these peripherals are not necessary, I really can't see how you can work efficiently without 48K of RAM and at least one disk drive.

The list of languages available for ATARI computers is growing rapidly. While consideration might be given to the use of "C", Forth, Pascal, and PILOT, at least 90% of the software currently available for ATARI computers is written in BASIC, Assembly, or both.

I have found **The Basic Commander** from MMG Software to be a real time saver. This utility package locates itself in less than 5K of RAM, and places a wide range of useful functions at your fingertips. Without using Page Six, it provides many DOS functions, program renumbering, automatic line-numbering, block delete of a range of lines, user-definable softkeys, and pre-defined softkeys.

APX provides a number of useful utility products including **MASHER** (a BASIC program compressor). MASHER assigns numeric variables to the most frequently used numeric constants in your program, deletes REM statements and concatenates lines of code whenever possible. Although MASHER is probably the slowest utility program I've ever seen, it can cut program size down by as much as one-third.

XREF, from APX, is a cross reference utility program that rivals MASHER for speed. It comes in handy as a debugging tool for finding each reference to all of the variables used in your BASIC programs. It also lists the number of times each numeric constant is used.

Usually, the most time consuming part of writing a program is in creating sound effects, music, and graphics. While there is no single utility package that can do it all, a combination of various products can certainly be a great help.

APX provides a decent sound effects generator called **INSOMNIA**. This program is somewhat limited, but I have yet to find anything better.

Another approach to sound effects and music is provided by Educational Software's **Tricky Tutorials, #6** and **#10**. Tricky Tutorials teach by example and provide useful routines that you can use in your own programs. As of this writing, there are about a dozen of these excellent teaching programs.

As for music, the only music composing packages currently available to my knowledge, are **The Advanced Music System** from APX and ATARI's **Music Composer**. Unfortunately, neither provides an easy way to get the music files they generate into your own programs.

continued on next page

You can easily convert your Music Composer files into a new format with P.D.I.'s **Music Box**. Using the routines provided, you may then play your music during vertical blank interrupts, while BASIC is at your disposal.

There are a number of good utilities available for creating colorful, high-resolution graphics. Of the many character graphics products, my favorites are the character editor in Educational Software's **Tricky Tutorial #8**, and Sheldon Leemon's **INSTEDIT** (available through APX.)

For Player/Missile Graphics, Swifware's **PM-800** is a standout. It goes far beyond providing an excellent editor by also supplying a host of Assembly subroutines that you can use in your own BASIC programs. These subroutines provide everything for VBLANK joystick reading and Player/Missile movement to collision detection.

Two of the best playfield graphics utility packages are **DRAWPIC** from Artworx, and Datasoft's **MicroPainter**. Another alternative is the **Versa Writer Graphics Tablet**, from Versa Computing, which combines hardware and software.

For writing Assembly subroutines and programs, I recommend the **SYN-ASSEMBLER** from Synapse Software. For very large Assembly programs, Atari's **MACRO ASSEMBLER** along with **DDT** (Dunion's Debugging Tool from APX), are real power tools.

That sums up my toolbox, although there are no doubt many fine and useful utility products not listed here. I've listed only those that I use myself, and those I can recommend from experience. If you're thinking about buying a package that I did not mention, look for magazine reviews of that product, or ask your local dealer to recommend the right tool for your job. You may contact the vendors of the products I mentioned at the addresses listed below.

APX (Atari Program Exchange)
P.O. Box 427, 155 Moffett Park Dr.
Sunnyvale, CA 94086

ARTWORX SOFTWARE CO.
150 North Main Street
Fairport, NY 14450

DATASOFT INC.
19519 Business Center Drive
Northridge, CA 91324

EDUCATIONAL SOFTWARE
4565 Cherryvale Avenue
Soquel, CA 95073

M. M. G. SOFTWARE
P. O. Box 131
Marlboro, NJ 07746

SWIFTY SOFTWARE
64 Broad Hollow Road
Melville, NY 11747

SYNPASE SOFTWARE
5327 Jacuzzi Street, Suite I
Richmond, CA 94804

VERSA COMPUTING
3541 Old Conejo Road, Suite 104
Newbury Park, CA 91320

...and so there were keys for the Atari 400.



In the beginning there was the membrane keyboard.

So it was to be done that Inhome Software would create a full-stroke keyboard for the Atari 400 Home Computer and it would be called the B Key 400, and would sell for $119.95 U.S. funds.

The new B Key 400 was made so easy to install that the owner could do it himself in a miraculous two minutes.

With the B Key 400 keyboard from Inhome Software, you will follow into the land of professional home computers that are powerful, easy to program and have a great capacity that can be made even greater with Inhome Software 48K and 32K memory boards. It was done and it was good.

INHOME — WORLD FAMOUS INHOME SOFTWARE FOR SOFTWARE — SOFTWARE

Inhome Software Incorporated, 2485 Dunwin Drive, Mississauga, Ontario L5L 1T1. (416) 828-0775. Made in Canada.

EXTENDED DIRECTORY

by WES NEWELL

For some time now I have been unhappy with only having eleven spaces, including filename extension, to use for disk directory filenames. This forced me to undertake the task of trying to modify the DOS to accept longer filenames. Well, after many long and sleepless days and nights, I finally completed the job. The following Assembler source code will produce the program to modify DOS 2.0S.

The following advantages will be noticed:

1. Filenames to a maximum of 27 characters.
2. Any ASCII character from decimal 48 to 122 is legal anywhere within the filename, even the first character.

These are the disadvantages:

1. The modified DOS will not read the directory of the old DOS and vice versa. The directory can be changed to allow either DOS to read the other.
2. Allows 60 files maximum. That's four less than the current DOS 2.0S.
3. The disk format will take up seven more sectors, leaving 700 free sectors instead of 707.
4. Because DOS.SYS and DUP.SYS will both be modified, I have changed the name of DUP.SYS to dup.sys (lower case) to keep from loading one system with the other.

EXAMPLE

If you boot with the old DOS and put a diskette with the modified DOS on it into the drive and call up DOS, the system will not see DUP.SYS since it has been changed to dup.sys. Therefore the system will return control back to you. This works in reverse if you boot with the modified DOS.

If you are happy with the filename structure as it is now, wait until you have a hundred diskettes or so and a thousand different files and try to remember what CRUNCH CRCHO means. Calling the file Crunch_Crumble_and_Chomp would be so much easier, and you still have the three-character extender left over.

I will not go into detail as to how the program works but I think you will be happy with the results.

Also included with this article is a program that will automatically convert your directory to the modified version, provided you have copied the files to a diskette that was formatted using the modified DOS.

```
0000          45          .PAGE
              50 ;COPYRIGHT 1982 W. NEWELL
              60 ;NEWELL INDUSTRIES
0000          0100        *=    $4000        ;ORG AND RUN ADDRESS
4000 A91A     0110        LDA   #$1A         ;FROM THIS LINE TO
4002 8D3B09   0120        STA   $093B        ;LINE 1170 MODIFIES
4005 8DA522   0130        STA   $22A5        ;THE DOS AND DUP
4008 8D3624   0140        STA   $2436        ;SYSTEMS
400B A91B     0150        LDA   #$1B
400D 8D7309   0160        STA   $0973
4010 8D1E0C   0170        STA   $0C1E
4013 8DB50E   0180        STA   $0EB5
4016 8D6D0F   0190        STA   $0F6D
4019 8DEF30   0200        STA   $30EF
```

```
401C 8D0924      STA  $2409
401F A921        LDA  #$21
4021 8DCE0D      STA  $0DCE
4024 8D660E      STA  $0E66
4027 A960        LDA  #$60
4029 8D2D0F      STA  $0F2D
402C A920        LDA  #$20
402E 8D390F      STA  $0F39
4031 8D900B      STA  $0B90
4034 A9A0        LDA  #$A0
4036 8D8E0B      STA  $0B8E
4039 8D9B0B      STA  $0B9B
403C A906        LDA  #$06
403E 8D8F0B      STA  $0B8F
4041 A99D        LDA  #$9D
4043 8D910B      STA  $0B91
4046 A90B        LDA  #$0B
4048 8D920B      STA  $0B92
404B A9EA        LDA  #$EA
404D 8D930B      STA  $0B93
4050 A904        LDA  #04
4052 8D9C0B      STA  $0B9C
4055 A9A9        LDA  #$A9
4057 8D9D0B      STA  $0B9D
405A A900        LDA  #$00
405C 8D9E0B      STA  $0B9E
405F A907        LDA  #$07
4061 8D9C12      STA  $129C
4064 A930        LDA  #$30
4066 8DEA0E      STA  $0EEA
4069 A97A        LDA  #$7A
406B 8DEE0E      STA  $0EEE
406E A91D        LDA  #$1D
4070 8D430E      STA  $0E43
4073 8DAF22      STA  $22AF
4076 8D5324      STA  $2453
4079 A918        LDA  #$18
407B 8DDF0E      STA  $0EDF
407E 8D0B0F      STA  $0F0B
4081 8D9B22      STA  $229B
4084 8DDB30      STA  $30DB
4087 A91C        LDA  #$1C
4089 8D110F      STA  $0F11
408C A924        LDA  #$24
408E 8DC223      STA  $23C2
4091 A92E        LDA  #$2E
4093 8DF824      STA  $24F8
4096 A923        LDA  #$23
4098 8DFA24      STA  $24FA
409B A901        LDA  #$01
409D 8DCC23      STA  $23CC
40A0 8DD923      STA  $23D9
40A3 8D2A24      STA  $242A
40A6 8D4724      STA  $2447
40A9 8D3A24      STA  $243A
40AC A925        LDA  #$25
40AE 8DD123      STA  $23D1
40B1 8DDA23      STA  $23DA
40B4 8D0A24      STA  $240A
40B7 8D2B24      STA  $242B
40BA 8D4824      STA  $2448
40BD 8D3B24      STA  $243B
40C0 A943        LDA  #$43
40C2 8D4423      STA  $2344
40C5 A94F        LDA  #$4F
40C7 8D4523      STA  $2345
40CA A950        LDA  #$50
40CC 8D4623      STA  $2346
40CF A959        LDA  #$59
40D1 8D4723      STA  $2347
40D4 A949        LDA  #$49
40D6 8D4823      STA  $2348
40D9 A94E        LDA  #$4E
40DB 8D4923      STA  $2349
40DE 8D4D23      STA  $234D
40E1 A947        LDA  #$47
40E3 8D4A23      STA  $234A
40E6 A92D        LDA  #$2D
40E8 8D4B23      STA  $234B
40EB A944        LDA  #$44
40ED 8D4C23      STA  $234C
40F0 8D5C24      STA  $245C
40F3 A93A        LDA  #$3A
40F5 8D4E23      STA  $234E
40F8 A94D        LDA  #$4D
40FA 8D2324      STA  $2423
40FD 8DC524      STA  $24C5
4100 8DD224      STA  $24D2
4103 A94C        LDA  #$4C
4105 8D3124      STA  $2431
4108 8D4324      STA  $2443
410B 8D4E24      STA  $244E
410E 8D5924      STA  $2459
4111 8D6A24      STA  $246A
4114 8D8624      STA  $2486
4117 8DD524      STA  $24D5
411A 8DC52D      STA  $2DC5
```

```
411D A9EA        LDA  #$EA    ;THIS SECTION
411F 8D8A0D      STA  $0D8A   ;MODIFIES THE VTOC
4122 8D8B0D      STA  $0D8B   ;FOR 60 FILENAMES
4125 A90E        LDA  #$0E
4127 8D9B0D      STA  $0D9B
412A A90F        LDA  #$0F
412C 8D400F      STA  $0F40
412F A9BC        LDA  #$BC
4131 8D620D      STA  $0D62
4134 A000        LDY  #0
```

continued on page 31

ATARI® 400 or 800 OWNERS
INTRODUCE YOURSELF TO THOUSANDS OF NEW PROGRAMS
PLUG IN A FLOPPY DISK DRIVE FOR LESS THAN
$450.00

There are thousands of programs available only for computers with floppy disk drives. Micro Mainframe is proud to introduce our floppy disk drive system for the Atari® 400 and 800 computer systems. Our disk system provides the best features at the lowest price available.

STANDARD FEATURES:

- Comes complete and ready to run*
- Double density operation without patches to Atari® DOS
- Single or double density operation software or hardware selectable
- Printer port for standard Centronics parallel printers
- Eliminates the need for the 850 Expansion Interface
- 4K Printer spooler expandable to 54K
- Can be used with all your current Atari® peripherals
- Add additional drives for less than $300.00
- Supports double sided and 8″ floppy disk drives**
- MMF hard disk expansion drives available
- Reads all protected software disks
- Digital Phase Locked Loop Data Separation
- 90 Day factory warranty

With the addition of our expansion box, you can turn our disk drive into a full 64K Z-80® computer using your Atari® as a color terminal allowing you these additional features:

- Run CP/M® software
- Run TRS-80 Model II® software
- Run Oasis® software
- Full 64K Z-80® computing power
- Multiuser operation***

YOU'LL AGREE WITH EVERYBODY ELSE THAT MICRO MAINFRAME IS YOUR BEST BUY IN PERIPHERALS FOR YOUR ATARI® 400 OR 800

Dealer Inquiries are Solicited

MICRO MAINFRAME

11325 Sunrise Gold Circle, Bld. E
Rancho Cordova, CA 95670
(916) 635-3997

Atari is an Atari trademark
Oasis is a Phase One Systems trademark
CP/M is a Digital Research trademark
TRS-80 is a Tandy trademark
Maxi-DOS A is a Micro Mainframe trademark
Z-80 is a Zilog trademark

* Atari® DOS required
** Requires Maxi-DOS A® (available mid '83)
*** Requires Oasis® Software

continued from page 29

```
4136 B97641 1280 LOOP1  LDA   MOD,Y        ;CHANGES DUP.SYS
4139 993218 129Ø        STA   $1832,Y       ;TO dup.SYS
413C C8     13ØØ        INY
413D CØØ7   131Ø        CPY   #7
413F DØF5   132Ø        BNE   LOOP1
4141 AØØØ   1365        LDY   #Ø
4143 B95141 137Ø LOOP2  LDA   MESG,Y       ;NEW MENU TITLE
4146 99101F 138Ø        STA   $1F1Ø,Y
4149 C8     139Ø        INY
414A CØ25   14ØØ        CPY   #37
414C DØF5   141Ø        BNE   LOOP2
414E 4CØØ3Ø 1415        JMP   $3ØØØ           ;BACK TO DOS
4151 44     142Ø MESG   .BYTE "DOS 2.ØS MOD. DIRECTORY W.NEWELL 6/82"
```

```
4152 4F
4153 53
4154 2Ø
4155 32
4156 2E
4157 3Ø
4158 53
4159 2Ø
415A 4D
415B 4F
415C 44
415D 2E
415E 2Ø
415F 44
416Ø 49
4161 52
4162 45
4163 43
4164 54
4165 4F
4166 52
4167 59
4168 2Ø
4169 57
416A 2E
416B 4E
416C 45
416D 57
416E 45
416F 4C
417Ø 4C
4171 2Ø
4172 36
4173 2F
4174 38
4175 32
4176 64
4177 75
4178 7Ø
4179 2E
417A 53
417B 59
417C 53
```

```
Ø POKE 82,2:POKE 83,39:GRAPHICS Ø:POKE 752,1:POSITION 8,1:? "DISK DIRECTORY CONV
ERTER":? :?
5 DIM A$(192Ø),B$(192Ø),C$(192Ø),D$(32),IO$(5):IO$="h Sd'":D$=""
8 FOR I=1 TO 1889 STEP 32:C$(I)=D$:NEXT I:B$=C$:POKE 769,1:POKE 779,1:? "PRESS S
TART TO BEGIN"
1Ø IF PEEK(53279)<>6 THEN 1Ø
2Ø N=Ø:GOSUB 2ØØ:A$=C$:CMD=82:BUF=ADR(B$):N=1:T=Ø
3Ø POKE 77Ø,CMD:FOR S=1Ø5 TO 112:POKE 778,S:HI=INT(BUF/256):LO=BUF-HI*256:POKE 7
72,LO:POKE 773,HI
4Ø    Z=USR(ADR(IO$)):IF PEEK(771)<>1 THEN 4Ø
5Ø    BUF=BUF+128:NEXT S
55 IF T=1 THEN ? "}":? "PRESS START FOR ANOTHER DISK":GOTO 1Ø
6Ø FOR I=1 TO 1ØØ9 STEP 16:IF ASC(B$(I,I))<128 AND ASC(B$(I,I))>Ø THEN GOSUB 1ØØ
7Ø    NEXT I:CMD=87:BUF=ADR(A$):T=1:GOTO 5ØØ
1ØØ A$(N,N+12)=B$(I,I+12):A$(N+13,N+28)="                ":A$(N+29,N+31)=B$(I+13
,I+15):N=N+32:RETURN
2ØØ OPEN #1,6,Ø,"D:*.*"
21Ø TRAP 23Ø:N=N+1:INPUT #1;D$:IF N>6Ø THEN 3ØØ
22Ø GOTO 21Ø
23Ø CLOSE #1:RETURN
3ØØ CLOSE #1:POKE 752,Ø:? "}}}}}MORE THAN 6Ø FILES ARE ON THIS DISK!"
31Ø END
5ØØ POKE 77Ø,CMD:FOR S=1Ø5 TO 119:POKE 778,S:HI=INT(BUF/256):LO=BUF-HI*256:POKE
772,LO:POKE 773,HI
51Ø    Z=USR(ADR(IO$)):IF PEEK(771)<>1 THEN 4Ø
52Ø    BUF=BUF+128:NEXT S
53Ø IF T=1 THEN ? "}":? "PRESS START FOR ANOTHER DISK":GOTO 1Ø


NOTE: D$ IN LINE 5 SHOULD =32 HEARTS
NOTE: IO$ IN LINE 5 SHOULD ='h,space,S,INVERTED d,DIAMOND'.
```

the game control you've been waiting for

TRACK BALL



TG Products, the oldest and largest manufacturer of accessories for personal computers, brings you fantastic control and versatility with the new TRACK BALL control. You will be amazed at how accurately, quickly and easily you can position screen objects in advanced arcade-level games.

$64.95

TRACK BALL is designed for years of reliable, active play and is produced of the highest quality components. Models are available now for your Atari*, Apple II*, and IBM* personal computers. Ask for them at your dealer or order direct from TG Products, 1104 Summit Ave., Suite 110, Plano, Texas 75074. Telephone (214) 424-8568.

TG PRODUCTS

Allow two weeks for shipment.
All mail orders add $2.00 for postage and insurance.
Texas residents add 5% sales tax.

*Atari, Apple and IBM are registered trademarks of Atari Inc., Apple Computers, Inc. and International Business Machines Corporation, respectively.

DISPLAY LISTS simplified

by ALLAN E. MOOSE and MARIAN J. LORENZ

An important step in understanding your ATARI's graphics capabilities is to create your own custom display lists. This article will show you step-by-step how to mix text and graphics on your TV screen. Our method uses BASIC commands to modify Graphics Modes 0 through 8. BASIC sacrifices some of the ATARI's flexibility; however, these techniques will help you eventually create display lists in Assembly Language.

The graphics capabilities of the ATARI are controlled by a microprocessor chip called ANTIC (Alpha-Numeric Television Interface Circuit). Any display list is a *program* for ANTIC.

There is a display list program provided automatically by each BASIC graphics command, or you can define your own. The display list specifies where screen data is located, what display modes to use, and any special display options ANTIC is to implement. Since the display list describes the screen from top to bottom, any mix of graphics or text modes can be displayed on the screen.

To understand displays, you need to know a bit about television. In a TV, a beam of electrons is shot at the screen. The beam starts at the top left-hand corner and moves across the screen. When it reaches the right-hand side, the beam is turned off, returned to the left, and moved down slightly. It is then turned on again, and the process is repeated 262 times to form a completed screen image.

When the beam reaches the bottom right-hand corner of the screen, it is turned off and returned to the top left-hand corner to start over. These horizontal sweeps are called *scan lines* and are the basis of the display. The scan-line pattern actually starts above and ends below the physical boundaries of the TV screen. To assure that information is not displayed where you can't see it, the ATARI display usually is restricted to 192 scan lines, positioned in the middle of the screen.

Allan Moose is an associate professor (math/physics) at Southampton College, New York. Marian Lorenz is a special education teacher for handicapped children.

There are several other concepts you will need. These are:

ANTIC MODE NUMBER: ANTIC identifies modes with a set of numbers *different* from those used by BASIC. The ANTIC mode numbers corresponding to each BASIC Graphics Mode, 0 through 8, are listed in Table 2.

MODE LINE: A mode line is a grouping of scan lines into a fundamental unit for each Graphics Mode. For example, Graphics 8 uses one scan line per mode line; for Graphics 0 there are eight scan lines per mode line. Screen displays are made up of 192 scan lines grouped into mode lines (see Table 2).

LOAD MEMORY SCAN (LMS): The LMS number is the sum of the ANTIC mode number for the first mode line, plus 64. The LMS number has two functions. First, it tells ANTIC what mode will be used for the first mode line of the screen display. Second, LMS instructs ANTIC to take information from the screen memory area of RAM and display it. The next two bytes in the display list following the LMS number give ANTIC the starting address of the screen memory.

DISPLAY LIST POINTER: This is a variable that establishes the memory address for the first line of the display list. This address is found by the BASIC command: PEEK (560) + PEEK(561)*256.

JUMP WHILE VERTICAL BLANK (JVB): This signals ANTIC that the end of the display list has been reached and it must loop back to the beginning. The jump is located immediately following the last mode line of your display list and is indicated by the decimal number 65. The low byte of the return address is given by PEEK (560). The high byte of the return address is given by PEEK(561).

RAM REQUIREMENTS: The Graphics Modes differ in the number of bytes that must be set aside in memory for screen data (see Table 1).

continued on next page

RAM BYTES PER MODE LINE: Just as the Graphics Modes differ in their total RAM needs, they differ in the number of bytes required per mode line (see Table 2). This information is important for synchronizing the Operating System (OS) and ANTIC.

Developing a Custom Display List

STEP 1

Make a rough sketch of what you want to appear on the screen. Our example appears as Figure 1.

STEP 2

Select the Graphics Modes you want to use and the number of lines for each mode. Two requirements must be met. First, the total number of scan lines in all the mode lines should not exceed 192. If it does, the screen image may "roll." However, the total can be less than 192 with no adverse effect. Second, when you insert new mode lines into an existing display list, the total number of bytes required for the inserted lines must be a whole multiple of the bytes required per mode line in the existing display list. To understand this more fully, refer to Figure 2. Diagrams such as this are invaluable in planning a display list.

Our example will modify a Graphics 8 display list. Each line of Graphics 8 requires 40 bytes of RAM. Therefore, at the top we must insert at least two lines of Mode 2 (two lines × 20 bytes) to match the 40 bytes per line of Mode 8. At the bottom we will insert four lines of Mode 1, each requiring ten bytes, for a total of 40 bytes.

Matching up the byte requirements between inserted lines and existing lines insures that the text and graphics will appear where we want them.

STEP 3

After choosing the modes you want, determine from Table 1 which of them requires the most RAM. Use this mode as your base (existing) mode, onto which you make changes that create your custom display list. This insures that the OS has set aside sufficient memory to hold your screen data. We have chosen Modes 2, 8 and 1. Mode 8 requires the most RAM, so it will be our base mode, called in line 30, but first we'll write a line to clear the screen and turn off the cursor:

```
20 ? CHR$(125):POKE 752,1
```

Next we call the display list to be modified. Adding 16 to GR. 8 eliminates the GR. 0 window that is a normal part of GR. 8.

```
30 GRAPHICS 8+16
```

We recommend that you enter the program as we go along. It will help you understand the process.

STEP 4

PEEK the display list pointer and assign it to a variable such as "DL".

```
40 DL=PEEK(560)+PEEK(561)*256+4
```

The number 4 is added to the display list pointer for insurance. Recall that the TV generates scan lines that do not appear on the screen. To allow for this, BASIC Graphics Modes generate 24 blank scan lines at the start of the display list. Adding 4 to the display list pointer will make sure that we don't inadvertantly remove any of these lines.

STEP 5

POKE the LMS instruction into DL-1. The value 71 derives from ANTIC mode number 7, plus 64. This instruction will establish the first mode line of the display list. If

Figure 1

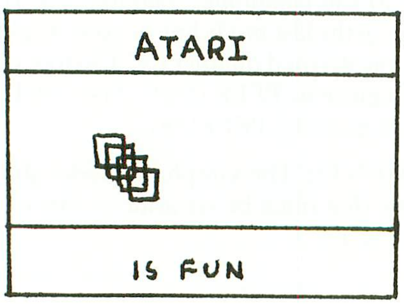


Figure 2

RAM Bytes / Mode		Scanlines
2 × 20 = 40	GRAPHICS MODE 2 (2 lines)	2 × 16 = 32
40 × 128 = 5120	GRAPHICS MODE 8 (128 lines)	128 × 1 = 128
4 × 10 = 40	GRAPHICS MODE 1 (4 lines)	4 × 8 = 32
		TOTAL 192

your first mode line belongs to your base mode, skip this step:

```
50 POKE DL-1,71
```

STEP 6

Every mode line in your diagram requires a statement in your display list. Write these in the same order as they appear on the screen, and POKE the ANTIC mode numbers as appropriate. This is the second line of our Graphics Mode 2.

```
60 POKE DL+2,7
```

From the diagram we can see that the next 128 lines are Graphics 8. Since this is our base mode, these lines already exist in the display list. The next mode lines to insert are the four Graphics 1 lines at the bottom.

```
70 POKE DL+132,6
80 POKE DL+133,6
90 POKE DL+134,6
100 POKE DL+135,6
```

STEP 7

End the display list with a JVB, followed by the low byte and high byte of the return address:

```
110 POKE DL+136,65
120 POKE DL+137,PEEK(560)
130 POKE DL+138,PEEK(561)
140 GOTO 140
```

Now RUN the program. You will see the top section (GR.2) black, the bottom section (GR.1) black, and the middle section (GR.8) blue. To make the middle section black, change line 30 to:

```
30 GRAPHICS 8+16:SETCOLOR 2,0,0
```

Table 3 shows the relevant portions of our display list and demonstrates another important point. Line 30 of our program has stored the LMS instruction in Address 32825. Line 40 stores the value 7 in Address 32828 to give us the second mode line of Graphics 2. Instructions for the Graphics 1 lines and JVB are stored in Addresses 32958 through 32962.

Look at Addresses 32921 through 32923. Note that here in the middle of the display list is another LMS instruction followed by a screen memory address! The reason is that ANTIC cannot address a block of memory longer than 4K bytes. Since Graphics 8 requires 8K bytes, the screen memory must be broken up into two blocks. ANTIC is sent to the first block of screen memory by the first LMS instruction in Address 32825, and is sent to the second block of screen memory by the second LMS instruction in Address 32921. "Jumping the 4K boundary," occurs only for Graphics 8.

You must be careful of two things when you modify a Graphics 8 display list. First, don't clobber the second LMS instruction and the two following bytes by putting mode lines in their place. Second, you must calculate an offset if you change modes after the boundary jump. We did this in line 70, by adding two lines to the display list (DL + 132 vs. DL + 130).

At this point the actual display is written into screen memory. The next task will be to print "ATARI" in the Graphics 2 section. Line 10 established GR.8 and instructed the OS that data in screen memory is to be interpreted as graphics, not text. Consequently if we simply enter PRINT #6: "ATARI", the OS will not carry out the command. The OS must be told how to interpret the data it finds in screen memory by POKEing the appropriate Graphics Mode number into memory address 87.

```
140 POKE 87,2
150 POSITION 8,0:PRINT #6; "ATARI"
```

The OS positions text or graphics on the screen by counting bytes from the start of the screen memory associated with the Graphics Mode value stored in location 87. Thus, it is possible for total screen memory to be considerably longer than the memory for the mode the OS is using. This disparity can cause "cursor out of range" error messages and trouble positioning material on the screen.

The cure for both problems is fairly simple. Before creating a display on the screen, change the start of the screen memory to coincide with the start of the mode section where you want the display to appear. For the Graphics Mode 8 section this will eliminate the trial-and-error method of placement. For the Graphics Mode 1 section this will prevent a "cursor out of range" message.

To write our display we start with:

```
160 POKE 87,8
```

to tell the OS what mode we're in. Then locate the current top of the screen address with:

```
170 TPSCRN=PEEK(88)+PEEK(89)*256
```

Next, offset the variable TPSCRN by the number of bytes in the Mode 2 lines + 1 (four Mode 2 lines × ten bytes per line = 40 bytes):

```
180 TPSCRN=TPSCRN+41
```

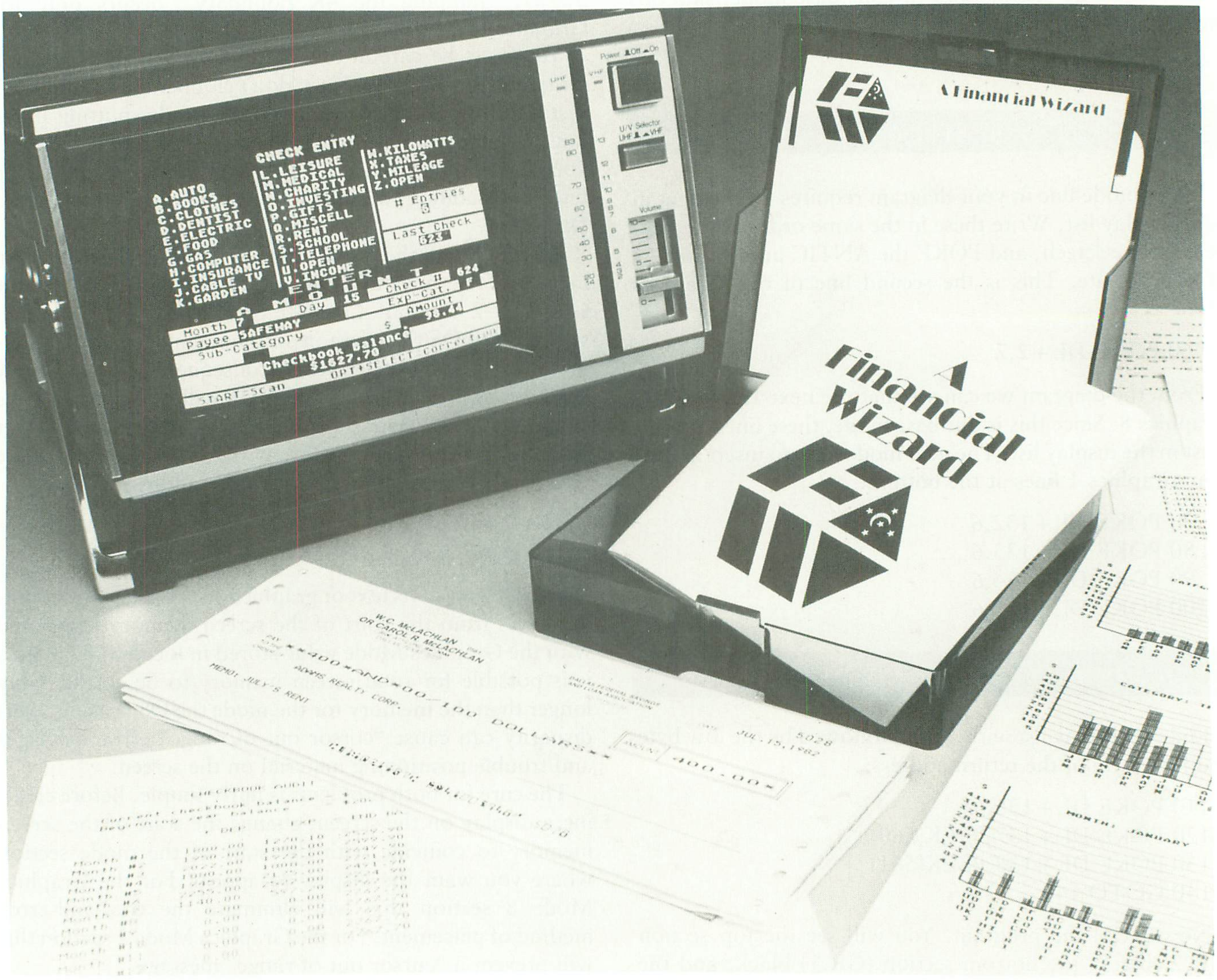
Finally, POKE this memory location back into 88 (low byte) and 89 (high byte):

```
190 POKE 88,TPSCRN-(INT(TPSCRN/256)*256)
200 POKE 89,INT(TPSCRN/256)
```

This procedure sets up the Graphics 8 section of our display so that the top left hand corner corresponds to posi-

continued on page 37

1983 - Take Control



THE HIGHLY ACCLAIMED PERSONAL FINANCE SYSTEM FOR ATARI*

- **Budget Forecast**–26 expense categories
- **Check Entry**–easy data entry–scan & modify 26 major & 36 sub-categories–information block
- **Check Search**–single or multiple parameters–(up to seven) to search entries
- **Tabulations**–detailed expense vs. budget comparisons by month, year-to-date, category
- **Bar Graphs**–screen displays in graph form expenses vs. budget–by month or category–printing with graphic capable printers
- **Check Reconciliation**–fast clearing of resident checks & deposits, complete summary report
- **Checkwriter**–prints your custom checks
- **Printouts**–most popular printers • **Audit Report**
- **Multi-Colored Graphics • Audio Enhancements**
- **7 Utility Programs • User-Friendly Operation**
- **Easy To Use Instruction Manual**
- **Handsome Tinted Plastic Storage Case**

The system is designed for Atari computers having a minimum of 24K and operating from a disk drive. The price is only $59.95 plus $3 for handling/postage.
If your dealer does not have **A Financial Wizard** . . .
Telephone orders are accepted on Mastercharge or Visa credit cards. Mail order must be accompanied by check or money-order or credit card #.
Dealer Inquiries invited. (405)751-2783.

*trademark of Atari Inc. OK residents ad 4% Tax.

A Financial Wizard Exclusively thru ON LINE COMPUTER CENTERS of OKC™ 10944 North May Oklahoma City, OK 73120 (405) 751-2781

☐ CHECK ENCLOSED ☐ ViSA ☐ MASTERCHARGE

NAME (Print) ____________________

Address ____________________

City ____________ State ________ Zip ________

Card # ____________ Exp. ________ Sig. ________

1317415947565176670555455318269469538260761362755826497779704551334
421115659818124365270594359063533663405909293314257359308946497694
063520691766858240668954456380404915667080443801934101792223008384
4014184146339935104873837641670690418532232017070800130293793206611

DISPLAY LISTS SIMPLIFIED

continued from page 35

place your display components.

```
210 COLOR 1:FOR I=1 TO 40 STEP 5
220 PLOT 60+I,40+I:DRAWTO100+I,40+I:
      DRAWTO 100+I,80+I:DRAWTO 60+I,80+I:
      DRAWTO 60+I,40+I
230 NEXT I
```

Finally, print "IS FUN" in the Mode 1 section at the bottom of the screen.

```
240 POKE 87,1
250 TPSCRN=TPSCRN+5121
```

Line 250 offsets TPSCRN to the beginning of the Mode 1 section. 5121 is obtained from (128 lines of Gr. 8) * (40 bytes per line) = (5120 bytes)+1.

```
260 POKE 88,TPSCRN-(INT(TPSCRN/256)*256)
270 POKE 89,INT(TPSCRN/256)
280 POSITION 6,2:?#6; "IS FUN"
290 GOTO 290
```

Table 1

GRAPHICS MODE RAM REQUIREMENTS

MODE	BYTES	MODE	BYTES
8+16	8138	4+16	696
8	8112	4	694
7+16	4200	3+16	432
7	4190	3	434
6+16	2184	2+16	420
6	2174	2	424
5+16	1176	1+16	672
5	1174	1	674
		0	992

Table 2

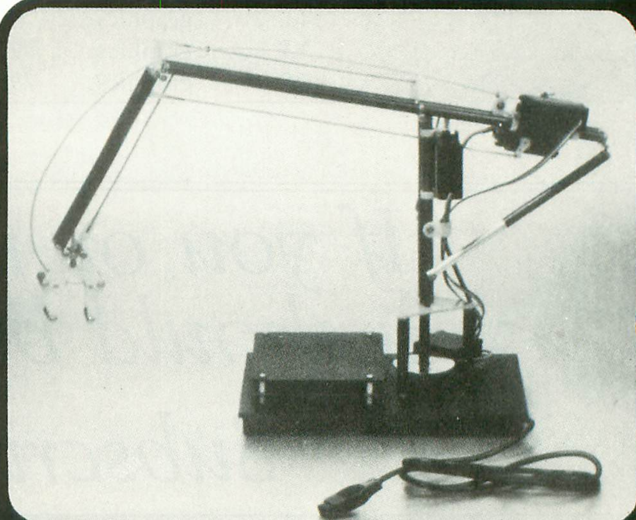
BASIC MODE NUMBER	ANTIC NUMBER	TYPE	LMS BYTE	# OF MODE LINES	SCAN LINES/ MODE LINE	RAM BYTES/ MODE LINE
0	2	text	66	24	8	40
1	6	text	70	24	8	20
2	7	text	71	12	16	20
3	8	graphics	72	24	8	10
4	9	graphics	73	48	4	10
5	10	graphics	74	48	4	20
6	11	graphics	75	96	2	20
7	13	graphics	77	96	2	40
8	15	graphics	79	192	1	40

continued on next page

Table 3

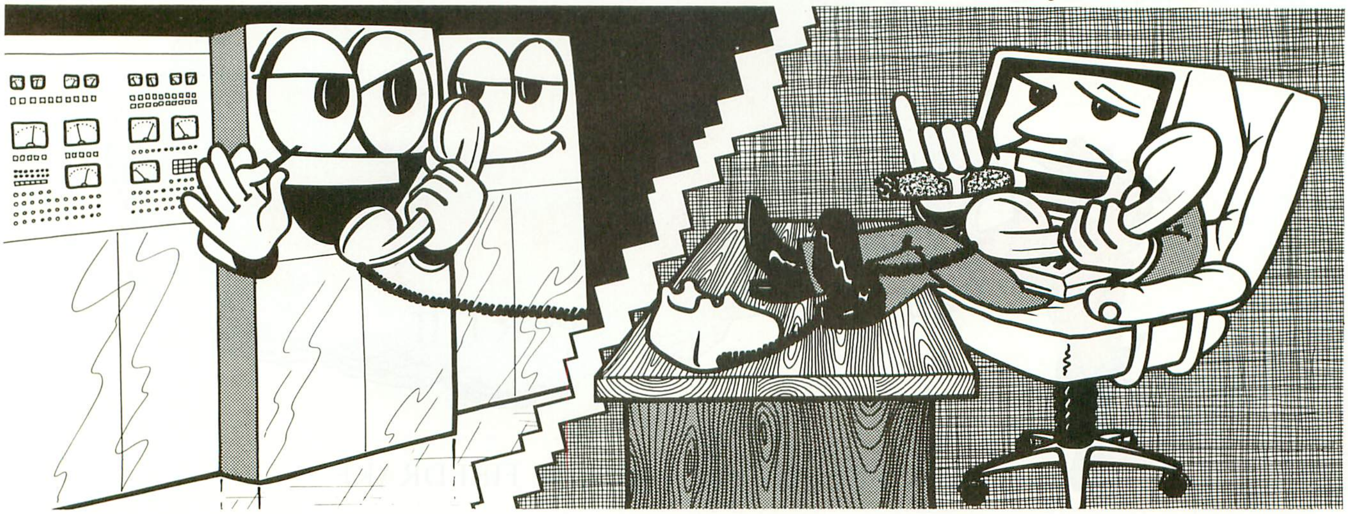
ADDRESS	OUR LABEL	VALUE	MEANS
32822	DL–4	112	*Blank scan lines provide for "overscan"*
23	DL–3	112	
24	DL–2	112	
25	DL–1	71	*LMS — 64 + 7 sets ANTIC mode 7 and one line of same*
26	DL	80	*gives address of start of screen memory LO-Byte + HI-Byte*256 = 33104*
27	DL + 1	129	
28	DL + 2	7	*sets ANTIC 7 for second mode line (equiv. of GR.2)*
32829	DL + 3	15	*reverts to ANTIC mode 15 for 128 mode lines (equivalent of GR.8)*
•	•	•	
32921	DL + 95	79	*LMS and address for 4K boundary jump, includes one line of mode 15*
22	DL + 96	0	
23	DL + 97	144	
32924	DL + 98	15	
•	•	•	
32957	DL + 131	15	
32958	DL + 132	6	*sets ANTIC mode 6 for four lines (equivalent of GR.1)*
59	DL + 133	6	
60	DL + 134	6	
61	DL + 135	6	
62	DL + 136	65	*JVB to address given by next two bytes*
63	DL + 137	54	*LO-Byte of return address*
32964	DL + 138	128	*128*256 = 32768, HI-Byte of return address*

+54
32822 = return address



DON'T ASK PROVIDES THE MISSING LINKS

the link between your modem and the outside world. For hassle-free communications, phone right in with TELETARI, The Friendly Terminal.



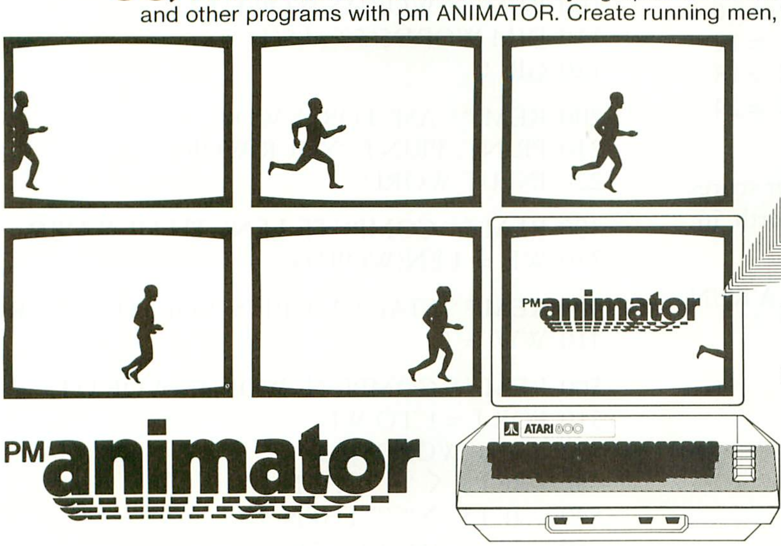
Your Atari has never had such easy access to the whole world of telecommunications – bulletin boards, news reports, large time-sharing computers, the works. Now it's a snap to tap into all these, and it's just as easy to transfer your program or text files to and from a remote computer. Meet TELETARI, The Friendly Terminal. It's just what your modem needs: a powerful, adaptable telecommunications package that's a cinch to use. With TELETARI, you simply choose the desired communications function from a menu. Commonly used terminal parameters are included in the program, but you can change them to suit your needs with a couple of keystrokes, using another handy menu, and store the ones you plan to use again. TELETARI's generous buffer stores up to 20K, so you can review, print, or save received information long after you've hung up the phone. You never knew using a modem could be so convenient. Because it's very flexible, TELETARI is compatible with most modems and a wide variety of computers. And because it works through the RS 232 port, TELETARI is not limited to modem/telephone uses. Put it to work in any RS232 application your imagination can devise – even operating a laser disk!

- buffer of up to 20K
- menu-driven
- highly adaptable
- supports all 850 options
- compatible with 1200 baud modems and BiT 3 Full-view 80™ board
- suitable for any RS232 application

$39.95 Requires Basic, 32K RAM, disk, 850 Interface

---

the link between BASIC and arcade-style graphics. Draw and animate pictures for your own BASIC games and other programs with pm ANIMATOR. Create running men, flying rockets, moving figures of all kinds.



Coming soon from DON'T ASK.

PManimator

BASIC programmers, pm ANIMATOR puts the power of Player-Missile Graphics at your fingertips.

$34.95 Requires 32K RAM, BASIC, disk.

To order direct from Don't Ask, send a check or money order, or call to order COD. Add $2.00 for shipping and handling. California residents add 6% sales tax (6.5% if you reside in L.A. County).

---

the link between fast game action and verbal learning:

WORDRACE

Kids and adults, increase your vocabulary while you compete in this exciting word game.

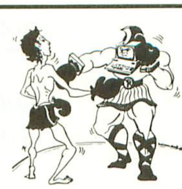
Disk version:
3 levels of play – Beginner, Regular, Challenge
Requires 32K RAM, disk, BASIC. $24.95

Cassette version:
2 levels of play – Beginner, Intermediate
Requires 16K RAM, cassette, BASIC. $19.95

turn WORDRACE into a history game or a famous athletes game, and get more vocabulary words, with the WORDRACE accessory disk: CLAIM TO FAME/SPORTS DERBY. 3 new games in all.

Disk only. Requires WORDRACE disk. $19.95

Atari is a trademark of Atari, Inc. Full-view 80 is a trademark of BiT 3 Computer Corporation.



the link between you and what your Atari is really thinking:

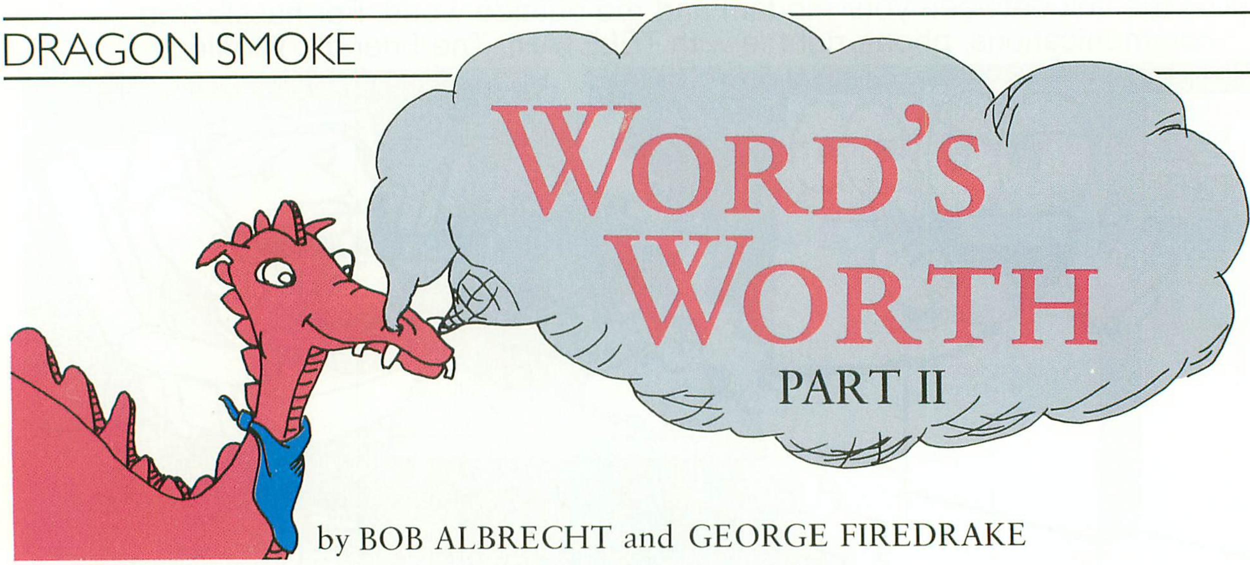
ABUSE

the insult-exchange program.
Have you cursed out your computer? Now it can understand you and answer back!
Requires 40K RAM, BASIC, disk. $19.95
Release your aggressions! Inflict ABUSE on anyone who's got it coming!

DON'T ASK
the link between technical excellence and the fun of computing. Why do we give you so much? Don't Ask.

DON'T ASK COMPUTER SOFTWARE INC.

2265 Westwood Bl., Ste. B-150
Los Angeles, CA 90064
(213) 475-4583 or 397-8811



WORD'S WORTH
PART II

by BOB ALBRECHT and GEORGE FIREDRAKE

DragonSmoke poses problems for you to ponder, questions for you to answer, programs for you to write, and whatever other mischief we might cunningly contrive. As time goes on, and as issue follows issue, we will answer some of the problems we create. Better yet, *you* answer.

Refresher

Last time we asked you to write a program to compute the WORD'S WORTH of a string of letters (WORDS$). We assigned letter scores (LS) to letters (L$), as follows.

A = 1	B = 2	C = 3	D = 4	E = 5	F = 6
G = 7	H = 8	I = 9	J = 10	K = 11	L = 12
M = 13	N = 14	O = 15	P = 16	Q = 17	R = 18
S = 19	T = 20	U = 21	V = 22	W = 23	X = 24
Y = 25	Z = 26				

A WORD'S WORTH (WW) is the sum of the letter scores in a word, or in any string of letters. HOBBIT is worth 56, DRAGON is worth 59, and WIZARD is worth 81.

Let's write a program to compute a Word's Worth. A RUN might go like this.

YOUR WORD? WIZARD
YOUR WORD IS WORTH 81 POINTS

YOUR WORD? ISN'T
YOUR WORD IS WORTH 62 POINTS
Ignore apostrophe (')

YOUR WORD? FLIP-FLOP
YOUR WORD IS WORTH 92 POINTS
Ignore hyphen (-)

YOUR WORD? ONE HUNDRED
YOUR WORD IS WORTH 108 POINTS
Ignore space

YOUR WORD? 3#AB%*Z
YOUR WORD IS WORTH 29 POINTS
Ignore everything except letters

YOUR WORD? 123
YOUR WORD IS WORTH 0 POINTS
No letters, so no points.

YOUR WORD? and so on . . .

Our program should compute the worth of any word or even any string of letters, even if it isn't a word.

Here is our program for WORD'S WORTH #1.

```
100 REM ** WORD'S WORTH #1
110 DIM WORD$(50), L$(1)
120 GR. 0

200 REM ** ASK FOR A WORD
210 PRINT: PRINT "YOUR WORD";
220 INPUT WORD$

300 REM ** COMPUTE LENGTH OF WORD
310 WL = LEN(WORD$)

400 REM ** START WORD'S WORTH AT ZERO
410 WW = 0

500 REM ** COMPUTE WORD'S WORTH
510 FOR L=1 TO WL
520   L$=WORD$(L,L)
530   IF L$ < "A" THEN 570
540   IF L$ >"Z" THEN 570
550   LS = ASC(L$) - 64
560   WW = WW + LS
570 NEXT L

600 REM ** PRINT THE WORD'S WORTH
610 PRINT "YOUR WORD IS WORTH"; WW;
    "POINTS"

700 REM ** GO FOR ANOTHER WORD
710 GOTO 210
```

This program is written in *blocks*. Each block begins with a

continued on page 43

The Official
ZAXXON™
by SEGA®



The game that puts space games in perspective. Zaxxon™, one of the most popular arcade games of 1982, is now available for use with your home computer system.

Zaxxon™ technology and creativity present a 3-dimensional-like playfield which sets Zaxxon™ apart from other computer games.

Zaxxon™ looks and sounds like aircraft flight, and players can soar to new levels of home computer entertainment. From the daring attack on the enemy's floating fortress and the blazing battle against the enemy's fighter fleet to the final showdown with the deadly armored robot, Zaxxon™ challenges the skill and imagination of every player at every level of skill.

Imagine yourself the pilot, attacking the enemy fortress–climbing, diving, strafing to score points and extra fuel. The enemy fights back with a barrage of missiles and gunfire. Then you face a fleet of enemy fighters in a gripping dogfight of altitude strategy and flying skill. Survive this battle and the enemy's fortress, defended with laser barriers, then you've earned the ultimate challenge; a blazing confrontation with the powerful robot, armed with a lethal homing missile.

Zaxxon™ is the one game that you must see to believe. You have to play it to feel its impact. If you're ready to face the challenge, check with your local software dealer or send check or money order with $2.00 postage/handling. California residents add 6½% sales tax. Available on cassette or diskette. Suggested retail price $39.95.

Available in January on Atari®, February on Apple® and Radio Shack® Color, and April on TI 99/4A™ and NEC 6000™.

Datasoft Inc.®
COMPUTER SOFTWARE
9421 Winnetka Avenue
Chatsworth, CA 91311
(213) 701-5161
©1982 Datasoft® Inc.

NOT EVERYONE CAN TEACH THEIR ATARI™ NEW TRICKS...



WE MAKE USING AND LEARNING ABOUT COMPUTERS FUN!

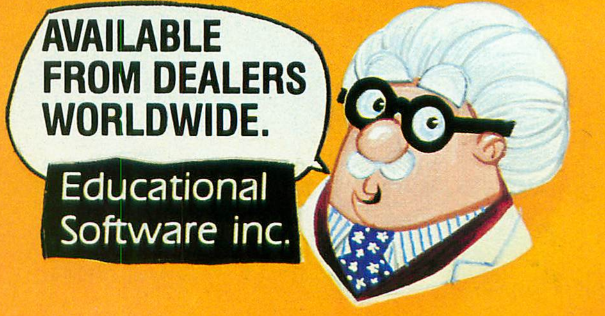
PROGRAMMING GUIDE FOR BEGINNERS OR EXPERTS — MASTER MEMORY MAP.™ A 32 page book with hundreds of hints on how to use your computer. Over 500 memory locations! $6.95.

LEARN SOUND AND GRAPHICS with our exciting lessons called **TRICKY TUTORIALS.™** Each comes with a tape or disk full of examples, and a 12 to 64 page manual written in an easy to understand manner. **#1 DISPLAY LISTS** — Put several graphics modes on your screen at once. **#2 SCROLLING** — Move text or graphics smoothly up, down, sideways, or diagonally. **#3 PAGE FLIPPING** — Change TV screens as quickly as flipping pages in a book. **#4 BASICS OF ANIMATION** — A beginner's lesson in animation using PLOT, PRINT, and a surprise game. **#5 PLAYER MISSILE GRAPHICS** — Learn the basics of writing your own arcade games. **#6 SOUND & MUSIC** — Simple methods to play complete songs, with graphics. Includes PLAYER PIANO free! **#7 DISK UTILITIES** — 7 programs to help you use your disk drive. 32K. **#8 CHARACTER GRAPHICS** — The best editor available with examples using special characters YOU CREATE and ANIMATE. **#9 GTIA, GRAPHICS 9 to 11** — New tricks you can do with these 16 color modes. **#10 SOUND EFFECTS** — Many examples, from rainfall to laser blasts, with ample explanation. **#11 MEMORY MAP TUTORIAL** — 30 colorful examples of tricks your computer can do.

TUTORIALS 1 to 4 are $19.95 each. Numbers 5 to 11 are $29.95 each. 16K Tape or 24K disk. SPECIAL: Tutorials 1 through 6 for $119.95. SAVE $20.00!

WRITE FOR A CATALOG OR CALL FOR ORDERING INFORMATION
VISA/MC/COD: (800) 692-9520 OR (408) 476-4901

OUR GUARANTEE: Your money back if unsatisfied!



4565 Cherryvale Ave., Soquel, Ca. 95073

continued from page 40

REM statement with a line number that is a multiple of 100. So, we have block 100, block 200, block 300, and so on. Most of the work is done by block 500.

Block 500 tells the computer to look at each character in the value of WORD$, beginning at the left. These characters are assigned, one at a time, to L$ (line 520). If a character is *not* a letter, lines 530 and 540 tell the computer to skip over lines 550 and 560.

Now suppose the value of L$ is a letter, A to Z. Line 550 computes the letter score (LS) of the letter, 1 for A, 2 for B, and so on. Line 560 adds this value to the Word's Worth (WW).

There is always another way. Here is another way to write block 500.

```
500 REM ** COMPUTE WORD'S WORTH
510 FOR L=1 TO WL
520   L$ = WORD$(L,L)
530   IF ASC(L$)<65 THEN 570
540   IF ASC(L$)>90 THEN 570
550   LS = ASC(L$) - 64
560   WW = WW + LS
570 NEXT L
```

And yet another way:

```
500 REM ** COMPUTE WORD'S WORTH
510 FOR L=1 TO WL
520   L$ = WORD$(L,L)
530   LX = ASC(L$)
540   IF LX<65 OR LX>90 THEN 570
550   LS = LX - 64
560   WW = WW + LS
570 NEXT L
```

And yet other ways may be incubating in your imagination.

Word's Worth #2

Of course you have probably expected that WORD'S WORTH #1 must be followed by WORD'S WORTH #2. Your turn. Modify WORD'S WORTH #1 so the Word's Worth is the product of the letter scores. For example:

WIZARD is worth 23*9*26*1*18*4 = 387,504 points
ISN'T is worth 9*19*14*20 = 47,880 points
ABC is worth 1*2*3 = 6 points

Begin your program like this.

```
100 REM ** WORD'S WORTH #2
```

The rest is up to you. We think you will have to change only two lines in our program for WW #1.

Now we will ask you a bunch of questions. To answer any question, you must find a word in a dictionary. Oh oh — too many dictionaries! To make things the same for everyone, let's all use the same dictionary. We choose the abridged *American Heritage* dictionary. It has 55,000 words. That should be enough for our wordy escapades. You can buy a copy for $3.95 at most any bookstore.

Yes, you people with 10, 20, or 30 pound dictionaries may also respond. Please tell us *what* dictionary you used, including most recent copyright date. If you come up with something interesting, we might take your word for it and mention your answer.

OK, with *American Heritage* abridged dictionary in hand, try one or more of these questions.

1. Can you find a word worth exactly 100? Exactly 1000? Exactly 10000? Exactly 100000? Exactly 1000000?
2. In case you are snowbound for a few weeks, try this one. How many three-letter words have a Word's Worth #2 less than 100? How can you use your ATARI to help find out?
3. What three-letter word has the smallest Word's Worth #2?
4. What three-letter word has the largest Word's Worth #2?
5. In the dictionary we selected, what word has the largest Word's Worth?
6. What is the most *interesting* three letter word? By most "interesting," we mean what word, together with its Word's Worth, is most interesting?

Scrabble Scores

In SCRABBLE, each letter has a letter score (LS), as follows.

A = 1	B = 2	C = 3	D = 2	E = 1	F = 4
G = 2	H = 4	I = 1	J = 8	K = 5	L = 1
M = 3	N = 1	O = 1	P = 3	Q = 10	R = 1
S = 1	T = 1	U = 1	V = 4	W = 4	X = 8
Y = 4	Z = 10				

Write a program to compute the Scrabble score of a word, or any string of letters. Ignore anything that is not a letter. A RUN of your program might go like this.

```
YOUR WORD? CAT
THE SCRABBLE SCORE IS 5

YOUR WORD? ISN'T
THE SCRABBLE SCORE IS 4
```

Ignore aopstrophe

```
YOUR WORD? AZTEC
THE SCRABBLE SCORE IS 16
```

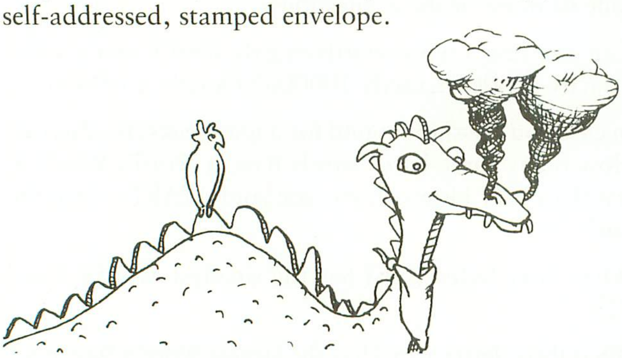
continued on next page

YOUR WORD? 12%3#
THE SCRABBLE SCORE IS 0
Only letters count!

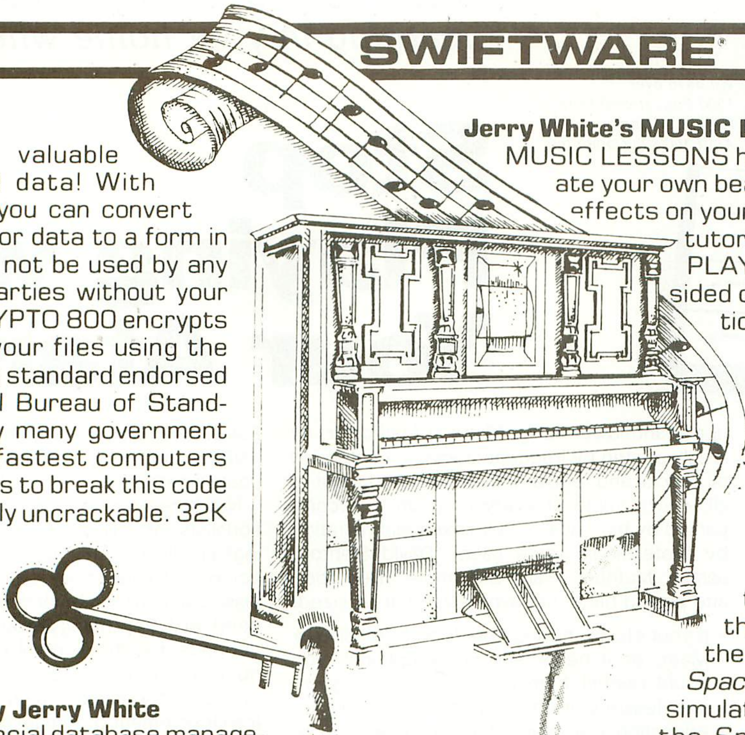
YOUR WORD? . . . and so on

Next Time

Next issue, we will show you our programs for WORD'S WORTH #2 and SCRABBLE SCORES. In the meantime, if you want to reach us, write to: George and Bob, P.O. Box 310, Menlo Park, CA 94025. If you want a reply, enclose a self-addressed, stamped envelope.



SWIFTWARE®



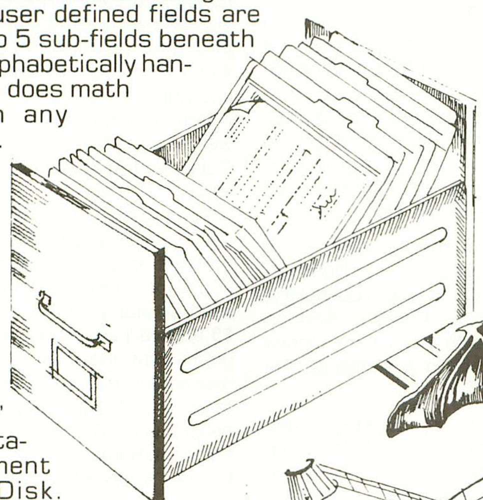
CRYPTO 800
Protect your valuable programs and data! With CRYPTO 800 you can convert your programs or data to a form in which they can not be used by any unauthorized parties without your secret key. CRYPTO 800 encrypts and decrypts your files using the data encryption standard endorsed by the National Bureau of Standards for use by many government agencies. The fastest computers would take years to break this code making it virtually uncrackable. 32K Disk. $39.95

Jerry White's MUSIC LESSONS
MUSIC LESSONS has everything you need to know to create your own beautiful music and a wide range of sound effects on your ATARI computer. This comprehensive tutorial contains 13 separate programs and PLAYER PIANO on 2 cassettes or 1 double sided disk and includes extensive documentation complete with program listings. 32K DISK 16K CASSETTE (24K required for PLAYER PIANO). $29.95



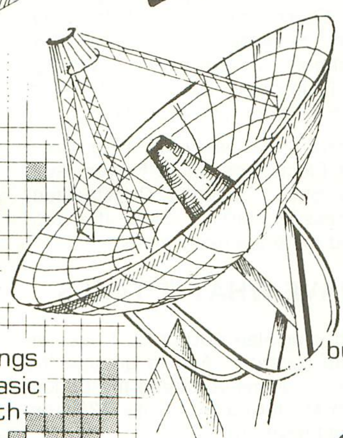
SPACE SHUTTLE by Paul Kindl
Join the crew of the *Space Shuttle* as they prepare to take the next step into the world of space travel. Take control of the world's first reuseable spaceship, the *Space Shuttle*, and in an accurate full graphic simulation, place yourself in the cockpit. Pilot the *Space Shuttle* through take-off with booster stage separations, orbit, descent down the glide path and landing to touchdown—complete with a chase plane and scrolling runway visible through the cockpit windscreen. You assume command throughout all phases of the mission aided by complete instrumentation. 32K Diskette. $29.95

FILE • IT 2 + by Jerry White
A powerful financial database management system. 6 user defined fields are created with up to 5 sub-fields beneath each main field. Alphabetically handles data and also does math computation on any selected fields. Data files are stored on separate disks with full field and subfield sorting with file merging. Supports up to 4 drives including the 128K Axlon Ramdisk. The "alternative" to more costly database management systems. 24K Disk. $49.95





HAUNTED HILL by George Richardson
Fight bats and ghosts in the dark of the cemetery. This exciting, all machine language game has arcade quality graphics and speed. Requires Joystick. $24.95 16K Cassette/$29.95 16K Disk.



P/M 800 by Fred Tedson
The ULTIMATE Player/Missile Editor
P/M 800 gives you complete control of all graphic functions: 5 players, colors, missiles, resolution, priority settings, etc. You create and save players and missiles as strings that can be incorporated into your own basic assembler programs allowing smooth arcade type action. Complete with a users tutorial that takes you step by step, exploring the fantastic graphic capabilities of the ATARI 400/800 computer. 32K Disk. $39.95

DATALINK by Tony Dobre
Top rated by national magazine reviews, purchased by NASA, this ultra-sophisticated menu-driven multioption smart terminal communications package supports uploading/downloading in full-duplex or simplex modes. Compatible with all the commercial services and bulletin boards such as the Source and Compuserve, etc. 24K Disk. $39.95

- **AVAILABLE AT SELECT COMPUTER STORES**
- **MAIL ORDERS:** Send check or money order plus $2.50 shipping and handling. N.Y. Residents add 7¼% sales tax.
- **TELEPHONE ORDERS:** (516) 549-9141

Send for FREE Catalog • Dealer Inquires Invited

SWIFTY SOFTWARE, INC.
64 Broad Hollow Road
Melville, New York 11747

MasterCard   VISA



We have over 1000 Educational Programs for use on your Atari 400/800 Computers!

You and your family will enjoy learning in your home when you

Stop Playing with Your Atari

All along you've heard there isn't much of a selection of low cost microcomputer courseware. Well, do you want to learn Physics, Psychology, or Philosophy? Accounting or Auto Mechanics? Sociology, Supervision or Statistics? Economics or Electronics? How about English as a Second Language? Would you like to teach your children Math or Reading? If you do, then we have the educational programs for you—and at affordable prices.

It's true there aren't many companies that offer full-length courses in subjects other than reading and arithmetic, and what is offered seems to be drills, tests, games, or simulations. What you really want is a course that covers the subject with, say, 16 full-length lessons called tutorial programs, where you interact with an expert programmer backed by a staff of experts. That's exactly what we have.

ASK THESE QUESTIONS

Why haven't you heard of us before? We're a public company that's been trading over the counter for 16 years. We've been developing interactive learning systems since 1957. We sell hardware and software for interactive film, slide, video and computer learning to the educational field, vo-techs, industries, military, and several state and federal agencies. Our programs are used in all 50 states and even in some foreign countries! In 1975, we started to convert to the Talk & Teach Computer-Assisted Instruction (CAI) System, licensed Atari to use it in 1977, and in 1981 licensed Radio Shack to use our Talk/Tutor System. So, why haven't you heard of us? Frankly, we've kept a low profile. Until now.

Is there something wrong with our software? Well, we don't ask you to enter your name so we can drop it into some later text. We don't ask you to type in your answer and refuse to accept it if it's not spelled just right. And, we don't branch around a lot when you make an error. Our programs simply let you know if you're wrong by proceeding only when you select the right multiple-choice answer.

This proven learning-by-positive-reinforcement method lets you proceed quickly and smoothly through the programs, without a lot of cute tricks. But, if you're a devoted computerist or game freak you may be disappointed at the lack of motion in most of the pictures, or our special visual effects. We have some dandies, like the mushroom cloud that rises over Hiroshima in our History series, but your learning is not distracted by needless special effects.

OVER 1000 PROGRAMS

We have 64 courses of 16 half-hour programs: 1024 programs! All are easy-reading, upper-and-lower-case. All are in Atari color. All are illustrated by frequent graphics, composed of special and regular characters. And, best of all, every frame of every program is accompanied by high-quality, full-time audio narration by professional voice talent. David Stanton, James Mathers, Pam Barrymore. Recorded and played back, not synthesized or digitized!

- If your child is having trouble with Reading or Math, or if he or she is exceptional, and could benefit from professionally programmed lessons or courses, then you need our educational programs for your Atari 400 or 800 to help your child.
- If you want to build your math skills, we have programs on Numbers and their meanings, Addition, Subtraction, Multiplication, Division, Fractions, Decimals, Percents, Angles, Graphs, Word Problems, Algebra, Statistics. There are ten series in all, 160 math programs. Again, all with color, pictures, and a friendly tutor's voice—all the time.
- If your verbal skills need polishing, try our Talk & Teach programs on the alphabet, spelling skills, and every level of vocabulary; Sight Words or Learn by Phonics; develop Reading Comprehension skills from stories and articles. There's even a series on the Great Classics.
- For self-development, try a 16-program course in Economics or Psychology. Or Supervision, Sociology, Counseling (Personal, School, or Employee), Writing, Business, Philosophy, Government, World History, U.S. History, or Accounting.
- For vocational skills, study our 16-program courses in Electronics, Fluid Power, Auto Mechanics, Shop, Carpentry, Construction, Meat Processing, Military Skills (64 programs), and there are many more.

YOU HAVE WHAT IT TAKES

You'll need your Atari 400 or 800, and the Atari Cassette recorder. And to present the Talk & Teach programs you need the Educational System Master cartridge: it's **$25** from us, if you don't have one.

We say these courses, which are recorded one program per side of C20 to C30 (half hour) cassettes, are the equivalent of a chapter, or perhaps an hours lecture. We've been told that by studying our Economics or Psychology course, a student could pass a secondary or college test for credit. Many who have such credits never learned all that's in these courses. And while some of our courses have 1980 copyrights, most are 1981 and 1982. In U.S. History, for example, you'll learn about America's foreign policy during the Falklands crisis as well as that in the Mideast in 1982. And we're putting this information at your fingertips.

Not sure whether you agree more with Rationalists or Existentialists? Do you commit logical fallacies? Try our Philosophy course. If you're not sure about neurosis or psychosis, classical or instrumental conditioning, then you need our Psychology course. Just how independent is the Federal Reserve? Get Economics, Program 12. Confused about the changes in traditional roles of political parties? It's Government 5. And let our tutor tell you patiently and clearly about measures of dispersion and central tendency. Our Statistics goes through F tests. We even have 16 full-length audio-computer programs with Spanish words and phrases.

Remember, these are all for your Atari! Yes, we've done programs for TRS80 Model I, III, Color, for the Apple and T. I. But that's another story.

Would you like to do something more than play games on your Atari? Tired of squeaks and robotics and want to hear a human voice? Do you want to further your education or help your children along in theirs? Now you can. For just **$9.90**, we'll send you one cassette with 2 programs from the course of your choice, 100% guaranteed to work in your Atari, and you can try us out. Better yet, get one full course of 16 programs on 8 cassettes for only **$59.90**. For full documentation, 32 pre-post tests, fancy binder, 8 cassettes with 16 programs of the course you want, send **$79.00**. That's less than books and tuition for most college classes. And we offer a 10 day, 100% exchange allowance. Does your alma mater? Send us your check, or call us at (405) 288-2301 with your Visa/Master Card number. We'll send your educational software pre-paid. Please allow 15 days delivery. Or see your Atari dealer. He may have some of our courses in stock. You've got nothing to lose but your games!

DORSETT
Educational Systems, Inc.

P.O. Box 1226, Norman, OK 73070
(405) 288-2301

VISA MasterCard

JOURNEY TO THE PLANETS™

A space, adventure, and arcade action game for your ATARI® 400/800™ personal computer.

NEW



What is your favorite type of game; space, arcade, or adventure? "Journey To The Planets" presents an intriguing combination of all three as you find yourself on a strange planet in a strange universe. Luckily, the local gods are friendly and supply you with energy, a spaceship, and weaponry. In turn, you agree to search the universe for treasures for the gods. Board your ship, take off, accelerate through the upper atmosphere and out into space. Your flight should take you past many other inviting planets. With a slow approach and skilled maneuvering, you drop down through the planet's sky to a soft landing on its surface. Disembark and wander through several TV screens full of mystery and excitement. A different adventure awaits you on each planet.

Planetary adventures are designed to exercise your puzzle solving intellect, with arcade action thrown in to enhance the excitement. Although you are given as much time as necessary to solve each adventure, your score, which is based on many factors, favors those who are speedy.

After you capture all the treasures this universe has to offer, return to your adopted planet. Who knows, the gods may be so happy that you can convince them to send you back to your real home. You can't get there without their help!

Available from your local Atari retailer or send $29.95 in check or money order (California residents add 6½% sales tax) to JV Software Inc.

A 32K assembly language program written for your ATARI® 400/800™ computer.

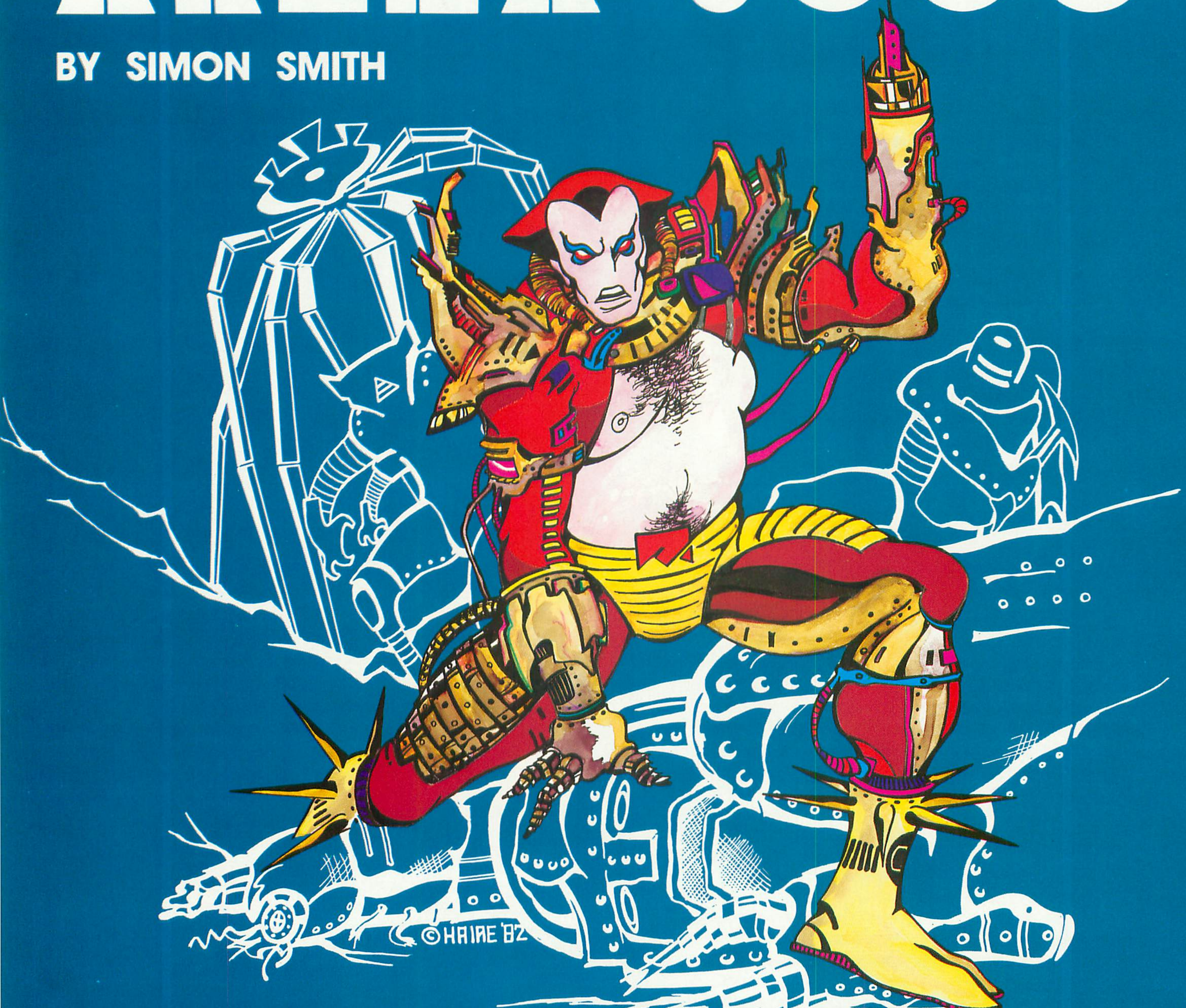
Other products by JV Software include Action Quest and Ghost Encounters, both 16K real time adventure games. Available on cassette or diskette for $29.95.

JV SOFTWARE, INC

3090 MARK AVE. SANTA CLARA, CA 95051

ARENA 3000

BY SIMON SMITH



Three hundred years in the future, the gaming grids are dominated by the human/machine hybrids known as cyborgs. As the newest achievement of the cybernetic sciences, your final testing demands that you battle, and defeat, the most dangerous robotics in the universe. Humanoid robots, killer hyper-spheres and giant spider creatures test your relays. Up to forty enemies converge on you as you frantically fire your arm pistol. As you clear each arena, your opponents move faster, take more hits, and mutate into additional nightmarish creations.

Arena 3000 can be played with one or two joysticks. One joystick moves your cyborg, the other fires your energy weapon. With one joystick, the joystick button fires your pistol. Arena 3000 has full color mode 7.5 graphics, incredible sound effects, one or two player options, and one or two joystick control. It saves high scores and pauses with the touch of a button. We guarantee that Arena 3000 is one of the fastest, most exciting games you'll ever play on your Atari, or return it within 14 days for a full refund.

ARENA 3000 Atari 400/800 16K cassette .$29.95 *ARENA 3000 Atari 400/800 16K diskette .$29.95*

Please add $2.00 for first class postage, $4.00 for overseas air mail.

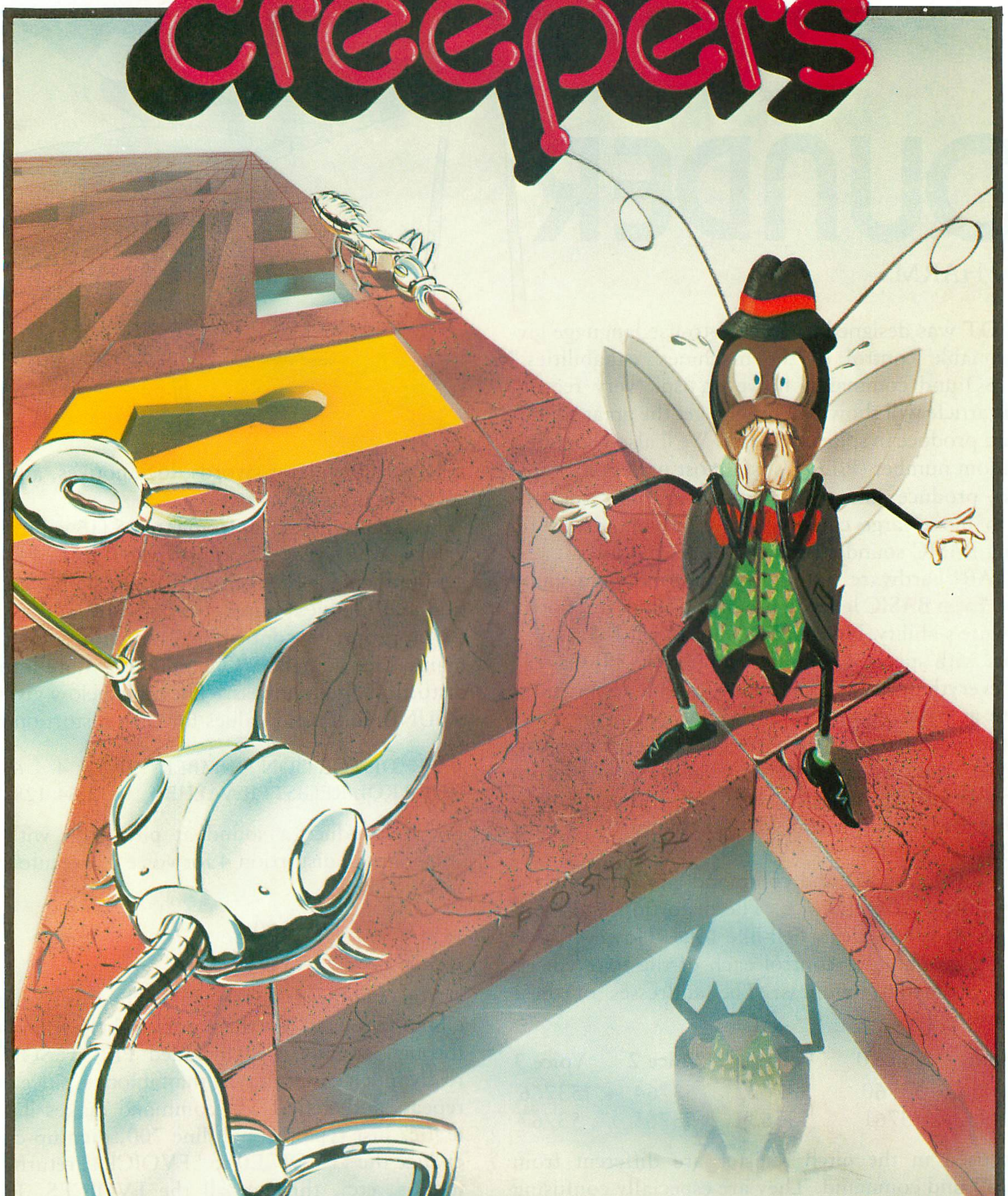
Med Systems Software • PO Box 3558 • Chapel Hill, NC 27514

To order, call: 1-800-334-5470, or see your dealer

FOR THE
ATARI 400/800

by James Albanese

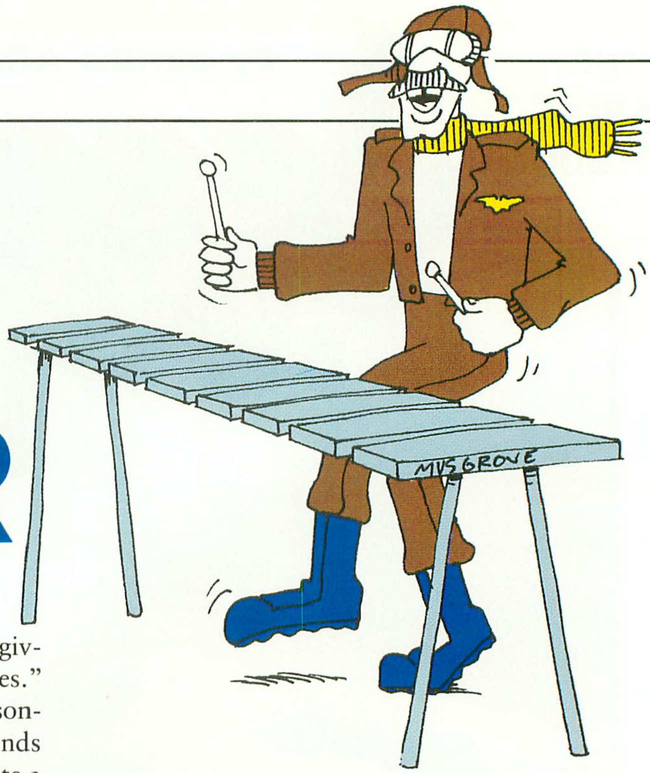
Jeepers Creepers



Nail-biting arcade excitement!
Available on diskette or cassette.
Requires 32K of user memory.
At your ATARI software dealer—$29.95

QS QUALITY SOFTWARE

6660 Reseda Blvd., Suite 105
Reseda, CA 91335
(213) 344-6599



SOUNDER

by KEN HARMS

Atari PILOT was designed as an easy-to-use language giving "reasonable control of the machines' capabilities." PILOT's SO:und command, however, isn't very reasonable. This article will show you how to get the great sounds ATARI can produce in spite of PILOT. We'll also generate a good random number (PILOT's is almost useless for most purposes), produce animated character graphics, use the joystick to move large cursors, and give you a start on translating BASIC sound effects to PILOT modules.

The ATARI hardware system is the consummate sound computer. Even BASIC lets you use only a small fraction of the hardware's ability. Normal PILOT lets you use almost none. But, with special C:ompute commands, PILOT can give you everything BASIC can. That special command is "Compute at byte" or, in PILOT, C:@Bxxx. The "xxx" refers to the "address" of a "byte" (or character) of memory. The ATARI uses values in certain "addresses" to turn sounds on or off, set margins, etc. For instance, to tell ATARI that the left margin should be at column 3, we issue a C:@B82 = 3.

Under PILOT, the SO:und command controls only the frequency (pitch) of each voice. The distortion and loudness are set to give a clear, bell-like tone. However, two registers are available to control each of the four voices' pitch and distortion/loudness. The addresses of these registers are:

Function	Voice 0	Voice 1	Voice 2	Voice 3
Pitch	53760	53762	53764	53766
Control	53761	53763	53765	53767

Numbers used in the pitch register are different from PILOT's SO:und command. They are especially confusing because larger numbers in the pitch register produce lower tones (opposite of normal PILOT). Luckily for translators, the pitch numbers are the same as BASIC's sound command.

The real fun starts with the control register. ATARI cleverly uses these values to control both the loudness and distortion of the voices. Different distortion values produce machine guns, laser swords, locomotives, and many other special sounds.

Loudness values run from 0 to 15 (16 values). Distortion values occur every 32 points from 0 to 224 (8 values). To get numbers for the control register, simply add the distortion and loudness numbers you want, and assign them to the appropriate control register with a C:@Bxxx command. (See your BASIC manual for more information on distortion and loudness.) The table below gives the BASIC SOUND command values for each distortion number:

BASIC DISTORTION NUMBER	0	2	4	6	8	10	14
CONTROL REGISTER VALUES	0	32	64	128	160	192	224

So, to produce a sound at pitch 100 with loudness 8 (medium) in distortion 4 for voice 0, execute the following instructions:

```
C:@B53760 = 100
C:@B53761 = 8 + 64
```

You could wear out several keyboards typing the various combinations to test them out. To help you pilot your way through sounds, I've included PILOT SOUNDER. It's really much easier to type than it looks, since over half of it repeats and the AUTO command makes it almost automatic. Just type through line 700, then up-cursor to 610, change the *FVOICE0 to *FVOICE1, return, change #Qs to #Ss, etc., through all the FVOICES. Remember to change the C:@B values on the 80 lines. Then do the same for the CVOICEs. You'll have hours of fun planning sounds for your next PILOT program, or just sounding off — my kinds love it!

PILOT SOUNDER displays all eight registers and shows

continued on page 52

actions between the registers.

Lines 240 and 250 C:ompute values for the trigger (% T8 = 1 if pressed, 0 if not) and the position of the joystick (%J0 — see PILOT Primer, appendix D). I move them into numeric variables so that the values don't change as we proceed through the program. If the trigger is pressed, *CURSORMOVE blanks the old cursor (line 330), calculates the new position, and prints a new cursor (lines 460–470).

If the trigger was not pressed, *VALUECHANGE calculates a new value for the register where the cursor is. This is tricky. The A:ccept in line 520 puts the row value into the accept register where it's M:atched against line 530. If the cursor is in column #2 (pitches), line 540 jumps to a frequency (pitch) calculator for voice 0, 1, 2, or 3, depending on the match. Line 570 does the same thing for control values if the cursor was in column 3. See the PILOT Primer, pages 64 and 65 for more data on the JM: command. The *CVOICE modules use a little modulo math to calculate the distortion and loudness values stored in each register. They then call *FACTOR which increases or decreases these values based on the joystick position. Note that loudness values between 16 and 32, inclusive, are not allowed — in essence, we're using a base 16 (hexidecimal) counting system.

Now look at that long condition in line 210. When you ADD conditions, it's the same as "or-ing" them. That line says "if J0 = 0 or if J0 = 5 or if J0 = 6 or if J0 = 10 (any one of them) J:ump to *SENSE. Multiplying conditions [(J0 = 0)* (J0 = 5). . .] ANDs them and requires all to be true before the statement is executed.

SPECIAL EFFECTS presents a few simple sounds and graphics. Jackhammer was inspired by the *ATARI Connection*, Volume 1, Number 2 (which has 10 other neat sounds for ambulances, etc., in BASIC). Jackhammer C:omputes address 84 to set the cursor on row 8 and then address 82 to set the left margin on column 14. If the margin hadn't been changed, you'd have to use a POS:ition command before each T:ype command in *PICTURE — a lot of work! The neatest trick occurs on lines 1110 and 1150 which uses one of ATARI's many internal clocks to generate a semi-random number to control the length of the PA:use. The random number generated by the ? is just too big (+32768 to –32768) for most purposes. Address 20 always contains a number between 255 and 0 — and counts down every 60th of a second. Interestingly, the sound registers (and many other locations) are "read-only" registers which also contain random numbers between 0 and 255. They are even better for this purpose since they are more random than the count-down clock in address 20.

Jackhammer illustrates a simple counter to replace BASIC's FOR / NEXT loop. Here's how the two languages compare:

BASIC	PILOT
For Z = 0 to 15	C:#Z = 0
program . . .	*LOOPNAME
Next Z	program . . .
more program	C:#Z = #Z + 1
	E(#Z = 15):
	J:*LOOPNAME
	more program

PILOT uses more lines. It also runs much faster than BASIC — you'll probably have to slow down the BASIC routines you code.

The *BOUNCING BALL and *LIGHTNING modules were translated from Jerry White's excellent MUSIC LESSONS (available from Swifty Software — the package is jam-packed, two-sided disk in BASIC with many more special effects, player pianos, etc., in a tutorial format).

The ball translation shows how to handle non-integer loops (i.e., a FOR / NEXT loop using steps or values which are not whole numbers). I just multiplied them up to integers, as well as all values used for pitches, etc. Here's how it was done:

BASIC	PILOT
For Y = 22 to 20 Step –0.5	C:#Y = 22*2
program	*BALL 1
NEXT Y	program
	C:#Y = #Y + 1
	J(#Y >20):*BALL 1
	E:

Since there are 24 steps of 0.5 between 22 and 10, and 24 steps of 1 between 44 and 20, the loops are equivalent.

Throughout SPECIAL EFFECTS, I used numeric variables for register addresses rather than type them in each time (see *REGISTERS).

Another good source for special effects is Educational Software's TRICKY TUTORIAL #10 which codes about 50! As always, the most satisfying source is your imagination . . . assisted by PILOT SOUNDER!

listing on page 93



LONDON SOFTWARE presents THREE NEW GAMES FOR ATARI 400/800®

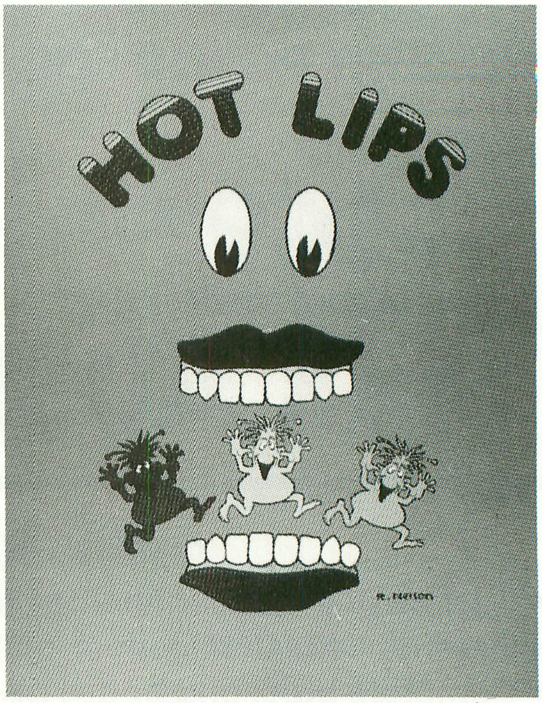
COMPUTE MAGAZINE GAME REVIEW. . . (Sept. 1982) says. . .

"Space Ace. . . requires the reaction instincts of a pro-hockey goalie. It's suitable for all but very young children and is aimed at the video game addicts among us. . . fans of arcade-style games should find Space Ace both well executed and challenging."

◀ Your ship, controlled in all eight directions by your joy stick, battles five incredible "bogies" whose unique shapes, sounds and actions are arcade quality in every way, and are guaranteed to "blow you away" unless you are a true SPACE ACE.

—3 levels of play
—bonus ship and time limit options
—100% machine language
—Hi-res graphics

$29.95

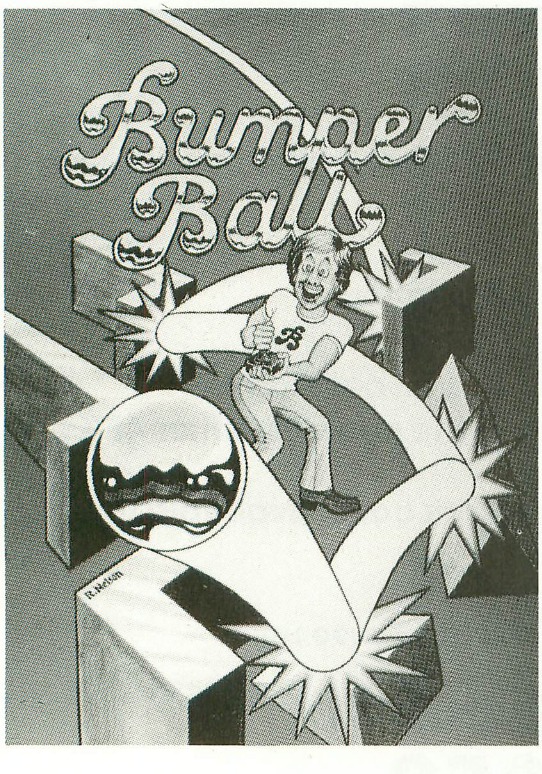


▲

CHOMP! CHOMP! CHOMP! Sounds and sights of giant gnashing teeth, marching critters and musical notes of delight greet you from the screen as you are tracked by an army of hungry little critters. To escape and score you must entice these critters into the crunching jaws of HOT LIPS. This megamouth eats anything, (including you!) and you must be quick to avoid its teeth. Various pitfalls and bonus scoring opportunities visually surprise and excite you as you become immersed in the strategy of this action-packed game. The "critters" are outstanding graphically and provide a challenge for every game player. Full hi-res graphics and exceptionally smooth continuous action make this a truly fun game.

—2 player option
—100% machine language
—multi-level of play

$29.95



Better than a pinball game; better than a maze game; This fast action game is for the new gamester as well as the true gamestar. Choose the "easyball" play level to start and get the hang of playing. You score by deftly controlling a fleet of paddles off which bounce multi-colored balls and travel through changing bumpers, multipoint gateways, and across flashing scoring zones.

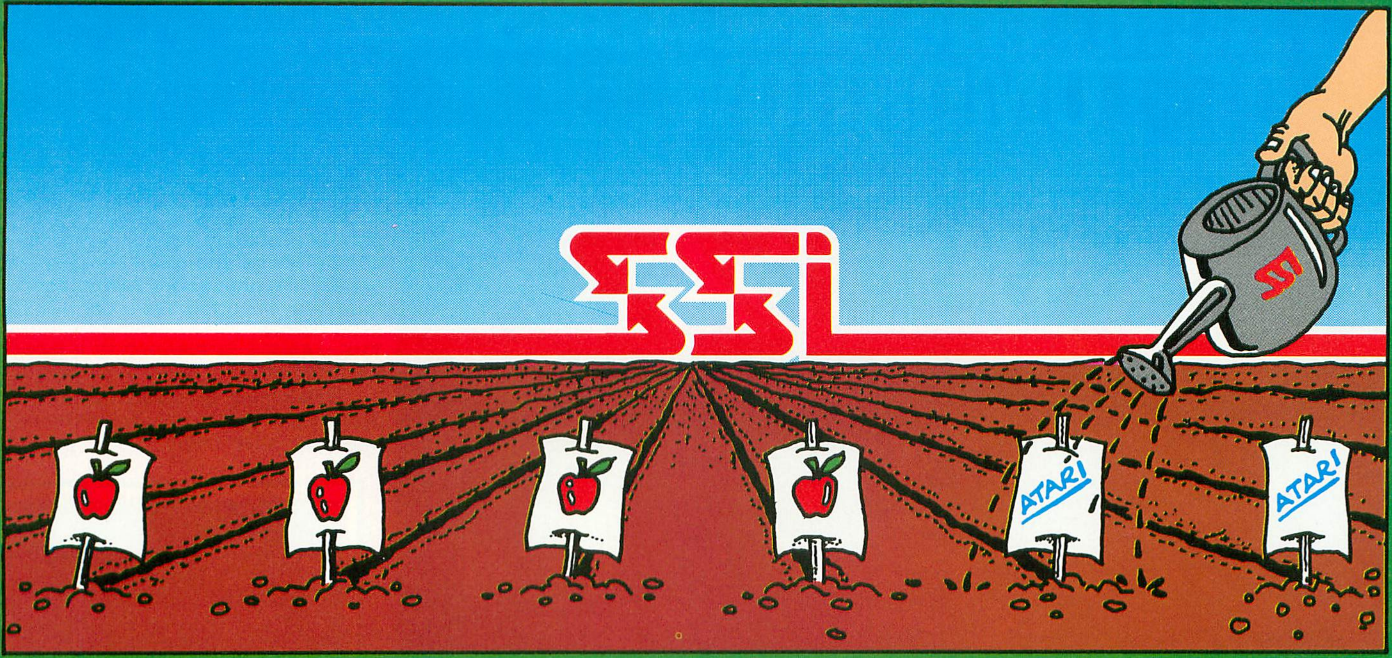
When you have mastered "easyball" shift up to the "bumperball" level of play. Everything gets tougher and you really have to "move out" to score. The action is fast and continuous, and the colors, sound, music and Hi-Res graphics are truly ◀ arcade quality. Two player option and 100% machine language of course!

$29.95

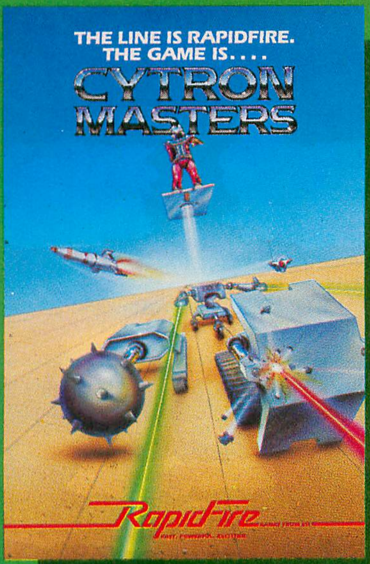
SEE YOUR DEALER OR ORDER DIRECT

Space Ace, Hot Lips, and Bumperball, all require 16K, joystick, and are available on either disk or cassette. See your dealer or order direct. London Software, 374 Wildwood Avenue, Piedmont, CA 94611. Phone orders (415) 893-1090. Visa/MC. Please add $1.50 postage and handling. California residents add additional $1.95 sales tax. ®Atari 400/800 is a registered trademark of Atari Incorporated.

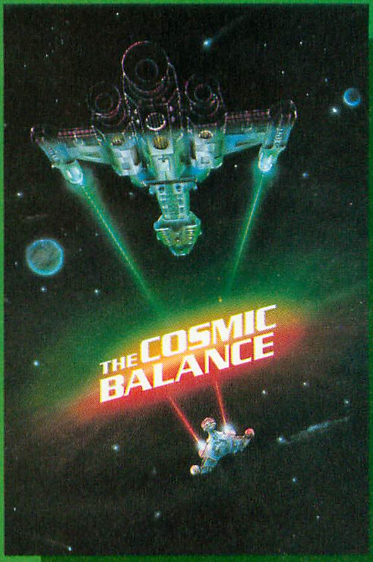
AT SSI, WE GROW MORE THAN APPLES.



INTRODUCING SOME NEW FRUITS OF OUR LABOR...FOR THE ATARI.®







At SSI, we cultivated our fine reputation in the computer gaming world by producing some of the best Apple® games around. But to paraphrase an old saying, "Man does not live by Apples alone."

So we bent our backs to the task of converting some of our Apple crops to the ATARI® 400/800. The three games you see above are the new fruits of our labor.

As part of our exciting *RapidFire* series, they contain all the ingredients needed to make the perfect strategy simulations for your Atari. Rooted in popular science-fiction and fantasy themes, they are challenging and sophisticated – yet fast and full of fun!

Best of all, they're ripe for the picking at your local computer/game store today!

■ **CYTRON MASTERS**™ puts you in charge of a small army of *Cybernetic Electronic Devices*. Your forces consist of laser-blasting shooter units, kamikaze-like mine cytrons, mobile bunker cytrons, guided missiles and anti-missiles. Use these mindless but deadly machines to crush your hapless foes, and you will someday become a...*Cytron Master*!
On 48K disc for $39.95; 32K cassette for $34.95.

■ **GALACTIC GLADIATORS**™ takes you to a remote corner of our vast universe to participate in a wild and crazy cosmic shootout. We're talking about four-armed Froglodytes with phasor rifles, Viking-like Wodanites wielding laser swords, and ugly Mutants whose only socially redeeming feature is their Death Touch. And these are the *nice* folks! On 48K disc for $39.95.

®ATARI is a registered trademark of Atari Inc.

■ **THE COSMIC BALANCE**™ is a tactical space game that not only lets you wage magnificent starship battles, it gives you the chance to *design and build* your ships from the ground up! With a host of variable parameters to choose from, you can equip your fleet with ships optimally designed to suit your style of space warfare. On 48K disk for $39.95.

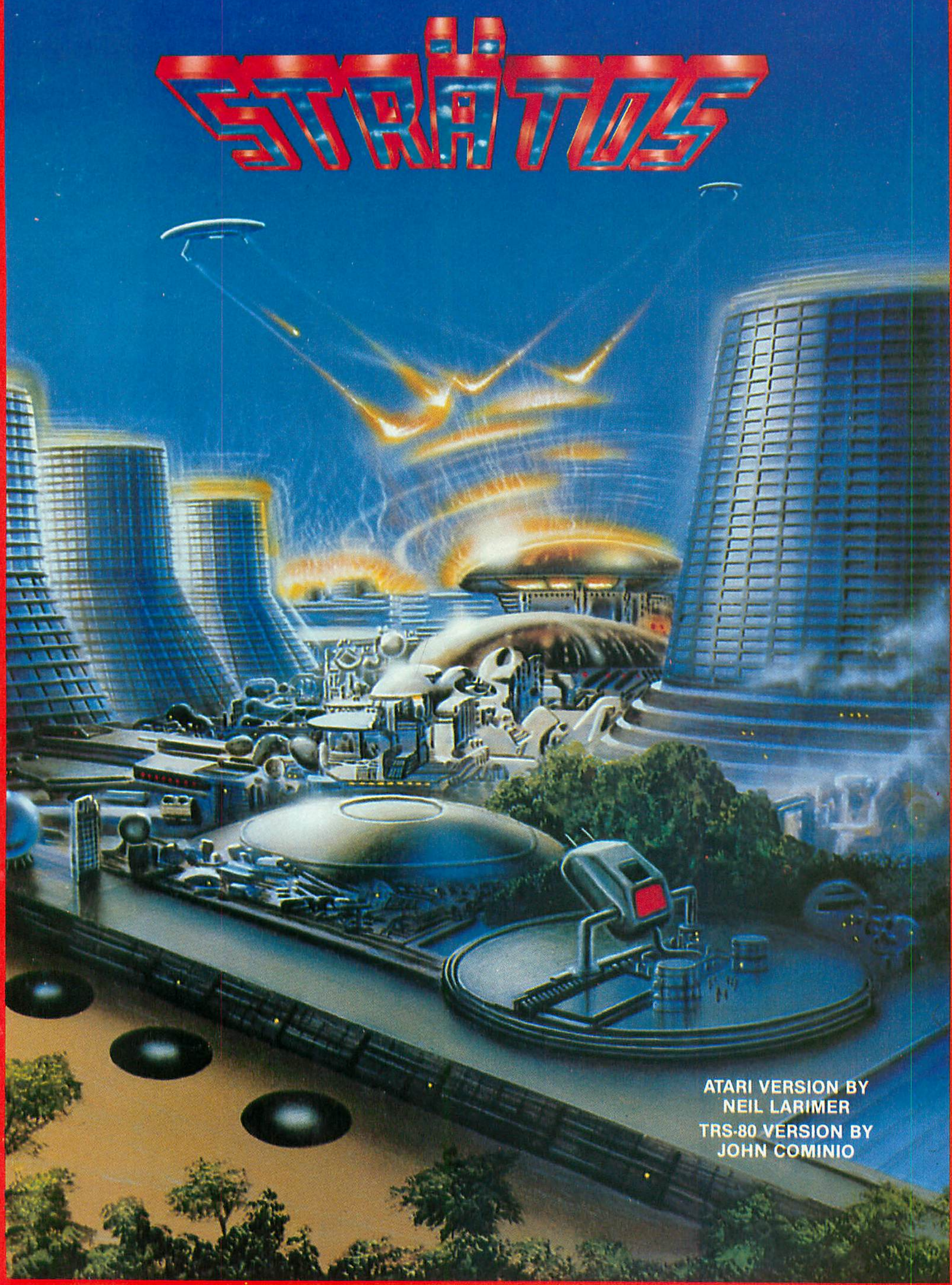
Coming soon – **COSMIC BALANCE II** – the strategic-level adjunct to *The Cosmic Balance*.

If there are no convenient stores near you, VISA and M/C holders can order direct by calling *800-227-1617, x335 (toll free)*. In California, call 800-772-3545, x335.

To order by mail, send your check to: *Strategic Simulations Inc*, 465 Fairchild Drive, Suite 108, Mountain View, CA 94043. California residents, add 6½% sales tax.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR ATARI GAMES TODAY!

FROM THE ARCADES OF TOMORROW . . .



A MICROCOMPUTER EXPERIENCE FOR TODAY

Arcaders who've seen and played the ATARI and TRS-80 versions of STRATOS came to the same conclusions — these state-of-the-art games were ahead of their time. After all, any program that boasts crisp graphics, punchy sounds, joystick compatability and a full complement of extras, like high score saving and multi-player option has a definite touch of tomorrow.

THE GAME'S SCENARIO IS A REAL KNOCKOUT

The object is to successfully defend a futuristic city from waves of attacking alien ships.



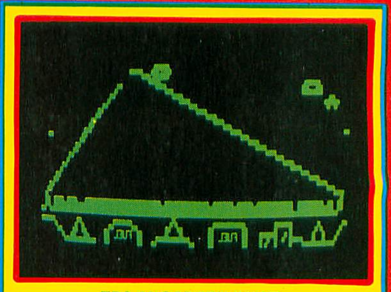
ATARI SCREEN SHOT
The battle begins! Atari version features colors and sounds that YOU can change!

And these crafty alien critters are just part of a rapid-fire graphics bonanza that includes meteor swarms, multiple attack waves, and even a free-moving saucer that will repair your city's damaged force field on the ATARI version.

GOOD NEWS

You don't have to wait years for the spectacular — STRATOS is available now for the ATARI and TRS-80 systems.

STRATOS. Entertainment of the future — today.



TRS-80 SCREEN SHOT
The TRS-80 version blows you away with its Arcade Action Graphics(tm)!

Adventure INTERNATIONAL

To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog.

Published by ADVENTURE INTERNATIONAL
a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 830-8194

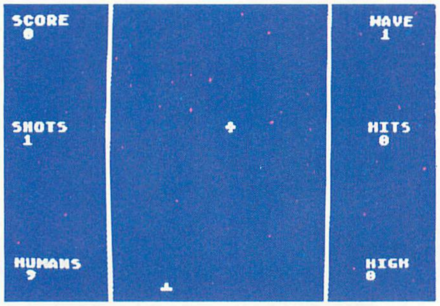
ARCADE ACTION GRAPHICS TM

AVAILABLE NOW!

ATARI 400/800 16K TAPE . . . 050-0161 $34.95
ATARI 400/800 32K DISK . . . 052-0161 $34.95
TRS-80 16K TAPE 010-0161 $24.95
TRS-80 32K DISK 012-0161 $24.95

PRICES SUBJECT TO CHANGE

STELLAR DEFENSE



by MIKE COLVIN

You have to be quick to shoot these invaders as they zig and zag down from the top of the screen. You can move your gun laterally with the joystick and fire with the button from your supply of 75 rounds. You score points for each attacker you hit, and lose a player if the attacker hits you. At the end of each wave your score is enhanced by the number of players you have left. Each game supplies four players, and an additional player is awarded after each wave is completed.

This game was written by Mike Colvin, a high school student in Sacramento, CA, who polished up his early version with the helpful suggestions of Jerry White, our Technical Consultant. It is gratifying to see the development of the several new programmers who have submitted games for this department, even when those programs have not been quite ready for publication. Keep hacking, gang.

```
  0 REM STELLER MODIFIED BY
     JERRY WHITE 8/31/82
  1 REM REDEFINED CHARACTER
     SET RECOMMENDED.
 10 GOTO 2000
 20 FOR W=20 TO 1 STEP -1:S
    T=0:POSITION A,W+1:? CH
    R$(32):SOUND 0,1,2,8:PO
    SITION A,W:? CHR$(124);
 24 IF A=Q AND W=B THEN SOU
    ND 0,0,0,0:POSITION A,W
    :? CHR$(32);:POP :POP :
    GOTO 400:REM invader ha
    s been hit
 26 SOUND 0,0,0,0:NEXT W:SQ
    =0:RETURN
100 POKE 752,1:POSITION 1,9
    :? "SHOTS";:POSITION 2,
    10:? SHOTS;:? " "
105 POSITION 1,1:? "SCORE":
    POSITION 2,2:? SCORE
106 POSITION 33,1:? "WAVE"
107 POSITION 34,2:? WAVE
108 POSITION 33,9:? "HITS":
    POSITION 34.10:? HITS
110 F$="|
     |":PEM Type SHIFT-KEY
    = ,19 spaces,SHIFT-KEY
    =
120 FOR X=0 TO 23:POSITION
    9,X:? F$;:NEXT X
130 A=15:POKE 559,34:SETCOL
    OR 1,0,14
139 REM main loop
140 Q=INT(RND(0)*33)
150 IF Q<=12 THEN Q=13
160 IF Q>28 THEN Q=28
174 FOR B=1 TO 22:POSITION
    Q,B-1:? CHR$(32):Q10=IN
    T(RND(0)*51):SOUND 0,96
    ,10,8
177 IF Q10<=20 THEN Q=Q-1:I
    F Q<=12 THEN Q=12
179 IF Q10>=30 THEN Q=Q+1:I
    F Q>=28 THEN Q=27
180 POSITION Q,B:? CHR$(16)
182 POSITION Q,B-1:? CHR$(3
    2)
185 IF ST>8 AND ST<15 THEN
    POSITION A,22:? CHR$(32
    );:A=A-1
186 IF ST>4 AND ST<9 THEN P
    OSITION A,22:? CHR$(32)
    ;:A=A+1
187 IF A<11 THEN A=11
188 IF A=29 THEN A=28
190 ST=STICK(0):SQ=STRIG(0)
    :POSITION A,22:? CHR$(2
    4);
213 IF B=21 THEN GOSUB 450
214 IF SQ=0 THEN GOTO 250
215 SOUND 0,210,10,8:NEXT B
250 SQ=1:SHOTS=SHOTS+1:IF S
    HOTS>75 THEN GOTO 800
251 POSITION 2,10:? SHOTS;:
    GOSUB 20:REM shoot miss
    ile
281 IF SHOTS=75 THEN GOTO 8
    00
282 POSITION A,W+1:? CHR$(3
    2)
283 SOUND 0,0,0,0
285 NEXT B:REM returns to m
    ain loop
290 SQ=1
300 IF SHOTS=75 THEN GOTO 8
    00
310 GOTO 140
399 REM invader hit; explos
    ion
400 ST=0:Q=0:S=(20-W)*10+10
    0
401 HITS=HITS+1:POSITION 34
    ,10:? HITS:SCORE=SCORE+
    S
403 POSITION A-1,B:? S
404 FOR Y10=1 TO 25:SETCOLO
    R 1,Y10,4:SETCOLOR 2,Y1
    0,4:SETCOLOR 4,Y10,8:SE
    TCOLOR 1,0,14:NEXT Y10:
    SETCOLOR 2,0,0
405 FOR W=0 TO 120 STEP 10:
    SOUND 0,W,0,15-W/17:SOU
    ND 1,128+W/2,8,8+7*RND(
    1):NEXT W:SOUND 1,0,0,0
406 POSITION A-1,B:? "   ":
    B=0
410 POSITION 2,2:? SCORE;:?
     " "
420 SQ=1:IF HITS=YP THEN GO
    SUB 600
425 IF SHOTS=75 THEN SOUND
    0,0,0,0:GOTO 800
```

continued on page 59


A New EPYX Graphic-Adventure for the ATARI 400/800*
THE NIGHTMARE
DREAMING or is it real?
Lost in a maze of haunted chambers...
pursued by fearsome creatures,
YOU'RE TRAPPED IN AN OLD CASTLE!
Don't listen to those screams...
seek the key to your escape...
reach the Iron Door. Pay no
attention to the footsteps behind you
—it's not the psychopathic killer!
Concentrate—THINK! Find Your
Mind's Eye hidden in the Death Tunnel.
WHERE IS IT?
THE NIGHTMARE, designed by Marc Russell Benioff
Byron Coons
Offers...
• Both Puzzle-Solving & Role-Playing Intrigue!
• Superb Graphics, Sound & Color Animation!
• Hours of Challenging Horror!
Requires...
• ATARI 400/800 & One Disk Drive
• One Player & Joystick Controller
Comes with...
• Game Program & Complete Instructions
• EPYX 30/FOREVER WARRANTY
Now Available At Your Favorite Dealer...$29.95
For the name of your nearest EPYX dealer write:
"THE NIGHTMARE"
EPYX/Automated Simulations, Inc.
1043 Kiel Court, Sunnyvale, CA 94086
EPYX
COMPUTER GAMES THINKERS PLAY
EPYX Temple of Apshai was the very first computer game ever to win the Hobby Industry award for excellence. EPYX pledges you that same excellence in every game you purchase from us ... the VERY BEST in entertainment!
EPYX 30/FOREVER WARRANTY
*Our 30-day Unconditional Guarantee: If your EPYX Game has any defect whatsoever within 30 days of purchase, return it to us or your dealer and we will replace it free.
*Our Forever Warranty: If anything happens to your disk at any time after 30 days, for any reason, just send it back with $5.00 for shipping, and we will send you a replacement.
*ATARI 400/800 is a trademark of ATARI, INC.

continued from page 57

```
430 SOUND 0,0,0,0:GOTO 140
449 REM invader has reached
     the bottom
450 FOR B=21 TO 1 STEP -1
460 POSITION Q,B:? CHR$(16)
480 POSITION Q,B:? CHR$(32)
490 POSITION Q,B+1:? CHR$(3
    2)
496 SOUND 0,B*10,2,8
500 NEXT B:SQ=1
501 SOUND 0,0,0,0
505 Q=Q+1:IF Q=28 THEN Q=14
506 H=H-1:IF H=0 THEN GOSUB
     800
507 POSITION 2,21:? H;:? "
    "
508 FOR OL=10 TO 210:SOUND
    0,OL,14,8:NEXT OL
510 SOUND 0,0,0,0:RETURN
599 REM end of attack wave
600 ? "}":SETCOLOR 1,0,0:SE
    TCOLOR 2,0,14:SETCOLOR
    4,0,0:POKE 752,1
610 POSITION 12,5:? "ATTACK
     WAVE ";:? WAVE:POSITIO
    N 13,6:? " COMPLETED"
620 BONUS=H*WAVE*HITS*10:PO
    SITION 13,8:? "BONUS ";
    :? BONUS:SCORE=SCORE+BO
    NUS
625 IF WAVE>0 THEN H=H+1
630 GOSUB 900
635 WAVE=WAVE+1:SOUND 0,0,0
    ,0:G=0
636 IF WAVE>0 THEN POSITION
     13,15:? "FREE HUMAN"
637 IF WAVE>0 THEN FOR TU=1
     TO 15:SOUND 0,35,12,8:
    FOR TI=1 TO 10:NEXT TI:
    SOUND 0,0,0,0:NEXT TU
638 SHOTS=0:HITS=0:GOTO 201
    0
700 GRAPHICS 0:SETCOLOR 2,0
    ,8:SETCOLOR 1,0,0:POKE
    752,1
710 ? :? "    THE OBJECT TO
     THIS GAME IS TO TRY  T
    O HIT AS MANY INVADERS
    AS POSSIBLE.":?
730 ? " AT THE END OF EACH
    WAVE YOU GET BONUS POIN
    TS ACCORDING TO THE # O
    F HUMANS   YOU HAVE LEF
    T."
740 ? :? " YOU GET AN EXTRA
     HUMAN AFTER EVERY    W
    AVE.":? :? "
      GOOD LUCK!!!"
750 ? :? :? "              "
    ;CHR$(16);"=? points"
751 ? :? :? "YOU ONLY HAVE
    75 SHOTS A WAVE SO MAKE
     THEM COUNT.":? :? "PRE
    SS THE FIRE BUTTON TO S
    TART!!!"
760 IF STRIG(0)<>0 THEN 760
761 GOTO 2008
799 REM end of game
800 IF SCORE>HIGH THEN HIGH
    =SCORE
805 GRAPHICS 18:SOUND 0,0,0
    ,0
810 ? #6:? #6;"    game over
    ..."
815 ? #6:? #6:? #6;"    YOUR
     SCORE ";:? #6;SCORE
816 FOR VOL=15 TO 0 STEP -0
    .2:SOUND 0,0,2,VOL:NEXT
     VOL
818 ? #6:? #6:? #6;"    pres
    s trigger":? #6;"      T
    O REPLAY"
819 REM **TYPE 'press trigg
    er' AND 'TO REPLAY' IN
    INVERSE VIDEO (ATARI LO
    GO KEY)
820 IF STRIG(0) THEN POKE 7
    11,PEEK(20):GOTO 820
830 SCORE=0:SHOTS=50:H=10:W
    AVE=1:HITS=0:SHOTS=0:GO
    TO 2008
899 REM music for end of at
    tack wave
900 FOR P=1 TO 60:READ VR:F
    OR S9=1 TO 10:SOUND 0,V
    R,14,8:NEXT S9:NEXT P:R
    ESTORE 920
910 SOUND 0,0,0,0:RETURN
920 DATA 45,40,37,40,37,37,
    45,40,37,40,45,47,47,45
    ,40,47,60,45,40,37,37,4
    5,40,37,40,45,47,53,40,
    47,60,45,40,37
921 DATA 40,45,47,45,40,37,
    40,45,47,45,40,47,60,45
    ,40,37,37,45,47,45,47,6
    0,47,45,45,45
999 REM sound for beggining
     of game
1000 FOR TY=2 TO 250 STEP 2:
     SOUND 0,TY,2,10:SETCOLO
     R 1,TY,9:SOUND 1,250-TY
     ,10,4:NEXT TY
1010 SOUND 0,0,0,0:SOUND 1,0
     ,0,0:RETURN
2000 G=0:SQ=1:WAVE=1:HIGH=HI
     GH:H=10:SCORE=0:SHOTS=0
     :DIM F$(100),A$(100),B$
     (100):HITS=0:REM sets u
     p variables
```

continued on next page

```
2001 GRAPHICS 1+16
2002 POSITION 2,1:? #6;"stel
     lar defense":POSITION 2
     ,3:? #6;"by mike colvin
     ":POSITION 1,10:? #6;"F
     OR ATARI 400/800"
2003 POSITION 1,15:? #6;"TO
     START PRESS THE  start
     KEY.":POSITION 1,18:? #
     6;"FOR DIRECTIONS
     PRESS THE fire"
2004 POSITION 1,20:? #6;"BUT
     TON"
2005 FOR U=1 TO 3000:IF STRI
     G(0)=1 THEN 2007
2006 SOUND 0,0,0,0:GOTO 700
2007 TTU=PEEK(53279):IF TTU<
     >6 THEN SETCOLOR 1,U,9:
     SOUND 0,RND(0)*80+50,10
     ,8:NEXT U:REM waits for
      a button
2008 SOUND 0,0,0,0:GRAPHICS
     2+16:POSITION 1,5:? #6;
     "  stellar defense":GOS
     UB 1000
2009 REM sets up board
2010 GRAPHICS 0:POKE 559,0:S
     ETCOLOR 2,0,0:SETCOLOR
     1,0,12:YP=INT(RND(0)*15
     ):IF YP<9 THEN YP=9
2011 POSITION 1,20:? "HUMANS
     "
2012 POSITION 2,21:? H
2013 POSITION 32,20:? "HIGH"
2014 POSITION 33,21:? HIGH
2020 SETCOLOR 1,0,12:SETCOLO
     R 4,0,6:GOTO 100
```

TYPO TABLE

Variable checksum = 647146

Line num range		Code	Length
0	- 105	WH	519
106	- 177	IO	544
179	- 250	BH	490
251	- 403	HC	382
404	- 430	DT	515
449	- 508	QT	404
510	- 637	BB	592
638	- 751	GF	550
760	- 820	YJ	506
830	- 1000	TL	594
1010	- 2003	EW	519
2004	- 2010	RQ	534
2011	- 2020	FP	177

TYPO EXPLAINED

Many of the program listings appearing in ANTIC are followed by a TYPO TABLE, which includes a variable checksum. TYPO is a program by Bill Wilkinson that appeared in ANTIC #3. After you've typed in a program, you can use TYPO to generate a TYPO TABLE. Compare this to the table in ANTIC. Discrepancies help you to find and correct typing errors. TYPO can be used by both disk and cassette users.

ANTIC #3 can be ordered as a back issue ($4.00). The program TYPO is present on ANTIC Utilities Disk #2 ($10.00 + $1.50 shipping), without instructions. Either or both can be ordered from: ANTIC Publishing, 297 Missouri St., San Francisco, CA 94107.

tiny text

by JIM CARR

TINY TEXT is a small but clever cassette-based text editor written by Stan Ockers, originally in the A.C.E. Newsletter (3662 Vine Maple Dr., Eugene, OR 97405). TINY TEXT was never intended to be an all-purpose word processor, even though it does provide several of the important features found in larger programs. TINY TEXT was written to facilitate submission of "machine readable" copy to the Eugene A.C.E. Newsletter. The real advantage of this program is that it is small, inexpensive, and very easy to use.

The program that follows is a slightly-enhanced version that includes:

- Support for Atari 820 printer
- Separate Print and Display modes
- Forms control for Print mode
- Top-of-page command for Print Mode
- Save text on Cassette or Disk
- Error trap control
- Adapts to different RAM sizes

Cassette tapes recorded by the original TINY TEXT can still be used with this modified version. Finally, this version corrects a couple of minor formatting bugs and is about ten percent "tinier" than the original.

Using the Program

The [OPTION] key selects one of five options: LOAD, EDIT, PRINT, SAVE, and DISPLAY. The following paragraphs describe each of these options.

The LOAD option reloads text that was previously saved on cassette or disk. When LOAD is selected, you will be asked to enter the "file spec" of the text you want to load. If the text is on cassette, simply type a C. The computer will "beep" once to remind you to set up the recorder to play. Then press [RETURN] to begin loading the text. If the text is on disk, type the complete file name of the text file, for example "D1:TTHELP.TXT".

The EDIT option lets you enter text or change text previously entered. When the Edit mode is requested, a blank area (text-entry window) appears in the center of the screen. Up to three lines of text can be typed into the window. Pressing [RETURN] causes text in the window to be added to previously entered text. You can use the standard screen-editing functions to edit text in the window. All trailing blanks in the window will be deleted, so it is good to end each entry at the end of a word and start each new entry with a space.

Such functions as tabbing and indentation are controlled by special formatting symbols. These symbols always cause the current line to be ended before the requested formatting function is executed.

CTRL E — End the current line and start a new line with no indentation.

CTRL I — Indent the next line.

CTRL S — Space before starting the next line.

CTRL T — Tab a specified number of spaces before the next line.

CTRL C — Center the next line.

CTRL P — Page. Advance the paper in the printer to the top of the next page before printing the next line.

When in the Edit mode, pressing the [SELECT] key will cause the line of text below the window to be moved up into the window. The normal screen-editing functions can then be used to fix the text in the window. Use the joystick to scroll the desired line to the position below the text window. Pressing [SELECT] twice (without making any changes) simply causes the text line to move up into the window and then back. To DELETE a line of text, move it below the text window and press [RETURN]. Press the joystick trigger to jump to the end of the text.

The PRINT option prints the formatted text on the printer. Before printing begins you may change the default settings for line length, tab stop, etc. Use the screen-edit functions to make any desired change, then press [RETURN]. The items that may be changed are:

LINE — Line length (maximum number of characters per line).

INDENT — The number of spaces

continued on next page

to be indented (left margin).

TAB STOP — The number of spaces for the tab stop.

PAPER SIZE — The total number of lines that can be printed on a fully-covered page. For example, 11-inch forms with six lines per inch has 66 lines.

FORMS FEED — The number of blank lines printed to separate the bottom of one page from the top of the next. For example, if three blank lines are required at the top and bottom of each page, then Forms Feed is set to six.

SAVE option lets you save text on either cassette or disk. The SAVE selection will ask for the "file name" to be used. If using a cassette, simply type C. The computer will beep twice for you to set up to record. After that, press [RETURN] to begin saving text. To save text on disk, enter the complete file name to be used. For example "D:TTHELP.TXT".

The DISPLAY option displays the text on the screen. It provides the same format-change options as the print option. Display is relatively slow. The program jumps to menu immediately after the last line.

Programming Notes

The default settings for the format control functions are defined at line 120.

If you make any changes to this program, you first make a change to line 14 which automatically expands the main data storage array T$ to use all available memory. Try changing "SIZ = FRE(0)–50" to "SIZ = FRE(0)–500". When you have finished making your changes you can restore the statement to its original form.

If a system error occurs, it is trapped and printed out by the program. You are then prompted to press [RETURN] to make the program continue at the OPTION selection mode. This will generally allow you to recover from errors without loss of data.

```
1 REM **** TINY TEXT ****
2 REM
3 REM Stan Ockers Sept-81
4 REM ACE Newsletter Nov-
  81
5 REM
6 REM Mod by Jim Carr 01-
  OCT-82
7 REM
12 DIM SP$(40):FOR I=1 TO
   40:SP$(I,I)=" ":NEXT I
14 DIM S$(45),I$(120),A$(1
   28):SIZ=FRE(0)-50:DIM T
   $(SIZ):FOR I=1 TO 45:RE
   AD A:S$(I)=CHR$(A):NEXT
    I
20 DATA 104,104,133,204,10
   4,133,203,104,133,206,1
   04,133,205,104,104,168,
   162,0,161,203,145,203,1
   98,203,165
30 DATA 203,201,255,208,2,
   198,204,165,203,197,205
   ,208,236,165,204,197,20
   6,208,230,96
40 FOR I=1536 TO 1643:READ
    A:POKE I,A:NEXT I
50 DATA 104,104,133,204,10
   4,133,203,104,133,206,1
   04,133,205,162,0,169,24
   0,32,53,6,169,40,32,91,
   6
60 DATA 165,207,208,8,169,
   160,32,91,6,24,144,10,1
   69,40,32,53,6,169,120,3
   2,91,6,169,240,32,53,6,
   96
70 DATA 133,208,161,203,20
   1,96,176,11,201,32,176,
   5,24,105,64,208,2,233,3
   2,129,205,230,203,208,2
80 DATA 230,204,230,205,20
   8,2,230,206,198,208,208
   ,221,96,133,208,169,0,1
   29,205,230,205,208,2
90 DATA 230,206,198,208,20
   8,244,96
110 P=241:POKE 207,0:POKE 8
    2,0:OPEN #2,4,0,"E:":T$
    (1)=".":T$(480)=".":T$(
    2)=T$
120 SCR=PEEK(88)+256*PEEK(8
    9)+120:LL=35:LM=1:IND=5
    :TAB=10:PS=66:FF=6:GOTO
     500
290 ? "INSERT TEXT OR ...
    PRESS SELECT TO EDIT"
300 POSITION 0,0:? SIZ-LEN(
    T$);" FREE    ":S=STICK(
    0):IF S=15 THEN 330
305 IF S=14 AND P<LEN(T$)-3
    20 THEN P=P+40
310 IF S=13 AND P>280 THEN
    P=P-40
315 IF S=11 AND P<LEN(T$)-2
    80 THEN P=P+1
320 IF S=7 AND P>241 THEN P
    =P-1
330 A=USR(1536,ADR(T$)+P-24
    1,SCR)
335 K=0
340 POKE 53279,8:PK=PEEK(53
    279):IF PK=5 THEN GOSUB
     900
350 IF PK=3 THEN 500
360 IF PEEK(764)<255 THEN 4
    00
365 K=K+1:IF K<10 THEN 340
370 IF STRIG(0)=0 THEN P=LE
    N(T$)-240:POKE 207,0
380 GOTO 300
400 POSITION 0,10:INPUT #2;
    I$:PK=PEEK(207):IF PK=0
     THEN A$=""
405 LI=LEN(I$):LT=LEN(T$):I
    F LI=0 THEN 460
407 IF LI+LT>SIZ THEN POSIT
    ION 0,1:? "OUT OF SPACE
             ":GOTO 300
410 IF PK=1 THEN A$=T$(P,P+
    39):IF T$(P+39,P+39)="
    " THEN I$(LI+1)=" ":LI=
    LI+1
420 LA=LEN(A$):AD=ADR(T$):I
    F LI>LA THEN A=USR(ADR(
    S$),AD+LT-1,AD+P-2,LI-L
    A)
430 T$(P,P+LI-1)=I$
440 IF LA>LI THEN T$(P+LI)=
    T$(P+LA)
450 P=P+LI:T$(LT+LI-LA+1)="
    ":POKE 207,0:GOTO 300
460 IF PEEK(207)=1 THEN 470
465 IF P<LEN(T$)-279 THEN T
    $(P)=T$(P+40)
470 POKE 764,255:GOTO 300
500 TRAP 950:ST=PEEK(560)+P
    EEK(561)*256+4:POKE ST-
    1,70:POKE ST+2,7:POKE S
    T+3,112:POKE ST+4,6:POK
    E ST+5,6
501 POKE ST+24,65
510 POKE ST+25,PEEK(560):PO
    KE ST+26,PEEK(561)
515 OP=OP+1:IF OP=6 THEN OP
    =1
520 ? CHR$(125):POSITION 20
    ,0:IF OP=1 THEN ? "LOAD
    "
522 IF OP=2 THEN ? "EDIT"
534 IF OP=3 THEN ? "PRINT"
536 IF OP=4 THEN ? "SAVE"
538 IF OP=5 THEN ? "DISPLAY
    "
540 POSITION 0,1:? "PRESS S
    TART TO BEGIN"
550 FOR D=1 TO 30:NEXT D
555 POKE 53279,8:IF PEEK(53
    279)=3 THEN 515
557 IF PEEK(53279)<>6 THEN
    555
560 POKE 764,255:POSITION 2
    0,1:? CHR$(125):POSITIO
    N 0,1:ON OP GOTO 2000,2
    90,590,1500,590
590 FOR I=1 TO 6:? CHR$(127
    );CHR$(158);:NEXT I:? :
    FOR I=1 TO 6:? "  ";CHR
    $(159);"    ";:NEXT I
594 POSITION 0,1:? "SET FOR
    MAT CONTROLS":POSITION
    0,6:? "LINE LEFT IN-  T
    AB  PAGE FORM"
595 ? "SIZE MARG DENT STOP
    SIZE FEED":? CHR$(127);
```

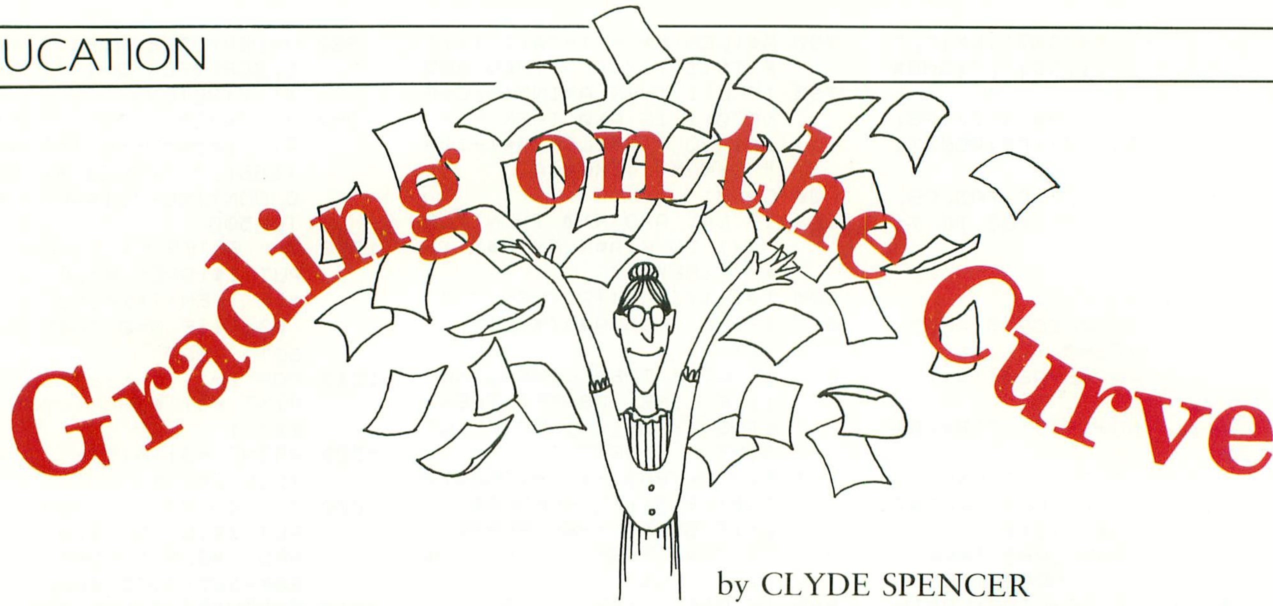
```
    LL;",";CHR$(127);LM;","
    ;CHR$(127);IND;",";CHR$
    (127);
596 ? TAB;",";CHR$(127);PS;
    ",";CHR$(127);FF:POSITI
    ON 0,8
600 INPUT LL,LM,IND,TAB,PS,
    FF:P=240:P=240:GO TO 71
    0
610 P=240
670 GOTO 620
710 LINE=0:GRAPHICS 0:POSIT
    ION 0,3:FL=0
715 RL=LL:TP=P:B=ASC(T$(TP,
    TP))
720 RL=LL-IND*(B=9)-TAB*(B=
    20)
725 IF B=19 AND OP=3 AND LI
    NE<=(PS-FF) THEN LPRINT
     " ":LINE=LINE+1
726 IF B=19 AND OP=5 THEN ?
727 IF B=16 AND OP=3 THEN F
    OR I=1 TO PS-LINE:LPRIN
    T " ":NEXT I:LINE=0
728 IF B=16 AND OP=5 THEN ?
     :? :? :LINE=0
735 C=0:K=0
740 K=K+1:TP=TP+1:IF K=RL+1
     THEN 765
745 IF TP>LEN(T$)-241 THEN
    FL=1:GOTO 810
750 A=ASC(T$(TP,TP)):IF A<3
    2 THEN C=0:GOTO 780
755 IF A=32 THEN C=C+1
760 GOTO 740
765 IF C=0 THEN A$=T$(P+1,T
    P-1):TP=TP-1:GOTO 810
767 IF T$(TP,TP)=" " THEN A
    $=T$(P+1,TP-1):GOTO 810
768 IF T$(TP-1,TP-1)=" " TH
    EN C=C-1
770 K=1
775 TP=TP-1:IF T$(TP,TP)<>"
     " THEN K=K+1:GOTO 775
780 IF TP=P+1 THEN P=TP:GOT
    O 715
785 A$="":I=P+1
790 A$(LEN(A$)+1)=T$(I,I):I
    F T$(I,I)<>" " THEN 805
795 IF C>1 THEN A=INT(K/C+R
    ND(0)):IF A>0 THEN FOR
    J=1 TO A:A$(LEN(A$)+1)=
    " ":NEXT J:K=K-A
800 C=C-1
802 IF C=1 AND K>0 THEN FOR
     J=1 TO K:A$(LEN(A$)+1)
    =" ":NEXT J
805 I=I+1:IF I<TP THEN 790
810 IF FL THEN A$=T$(P+1,TP
    -1)
815 IF OP=3 THEN LINE=LINE+
    1:IF LINE>(PS-FF) THEN
    LINE=1:FOR I=1 TO FF:LP
    RINT " ":NEXT I
820 SP=LM+(B=9)*IND+(B=20)*
    TAB+(B=3)*(LL-LEN(A$))/
    2:IF SP>40 THEN SP=40
830 IF OP=3 THEN LPRINT SP$
    (1,SP);A$
840 IF OP=5 THEN ? SP$(1,SP
    );A$
850 IF FL THEN 500
860 P=TP:GOTO 715
900 PK=PEEK(207):IF PK=1 TH
    EN POKE 207,0:GOTO 930
910 IF PK=0 AND P<LEN(T$)-2
    79 THEN POKE 207,1
930 A=USR(1536,ADR(T$)+P-24
    1,SCR):FOR D=1 TO 50:NE
    XT D:RETURN
950 ? "ERROR ";PEEK(195);"
    AT ";256*PEEK(187)+PEEK
    (186):? "PRESS RETURN T
    O CONTINUE":INPUT I$:GO
    TO 500
1500 ? " ENTER FILE NAME":IN
    PUT I$:OPEN #3,8,0,I$:N
    =INT(LEN(T$)/128):PRINT
     #3;N:IF N=0 THEN ST=0:
    GOTO 1520
1510 FOR I=1 TO N:ST=128*I:P
    RINT #3;T$(ST-127,ST):N
    EXT I
1520 PRINT #3;T$(ST+1,LEN(T$
    )):CLOSE #3:GOTO 500
2000 ? " ENTER FILE NAME":IN
    PUT I$:OPEN #3,4,0,I$:I
    NPUT #3,N:IF N=0 THEN B
    EG=-127:GOTO 2020
2010 GRAPHICS 0:FOR I=1 TO N
    :BEG=128*I-127:INPUT #3
    ,A$:? A$;:T$(BEG)=A$:NE
    XT I
2020 INPUT #3,A$:T$(BEG+128)
    =A$:CLOSE #3:POKE 1536,
    104:GOTO 500
```

TYPO TABLE

Variable checksum = 697637

Line num range			Code	Length
1	–	40	YW	509
50	–	110	SB	536
120	–	340	BY	525
350	–	420	ZC	500
430	–	520	JC	536
522	–	594	HJ	570
595	–	727	IS	505
728	–	775	CK	495
780	–	820	RC	515
830	–	1510	BL	556
1520	–	2020	IV	310

Grading on the Curve



by CLYDE SPENCER

The many ways to assign student's grades all seem to have their advantages and disadvantages. It is likely that the technique you use was originally adopted for its simplicity, speed and ease of use. Tossing the papers down the stairs and giving A's to the farthest even has some merit. However, a more professional approach might be desired.

Most approaches require additional effort and varying degrees of mathematical expertise, and the more rigorous, statistically-based ones have not been in favor.

Let's assume you are teaching a course where frequent standardized testing is appropriate and the students' abilities and accomplishments can be expected to be "normally distributed". If you plotted the numeric scores against the number of students that received scores within a given small interval, the plot would approximate the standard "Bell" shape. You should have at least 20 students minimum — a typical class size.

In a classroom like this you might be interested in a method utilizing "McCall's T Scores". It is a statistically-based technique that can be quite objective. Its singular greatest disadvantage used to be the amount of time it took to do the calculations. It used to take me about 2½ hours with a powerful hand calculator for a class of 30 to 40 students. With your ATARI computer it takes about as much time to enter raw scores in your gradebook as it takes to enter the scores on your computer keyboard. Twenty minutes later you can have a list from your printer that may be acceptable by your school administrators in lieu of your gradebook. It is also a relatively minor task to change a grade (especially with Visicalc) when you find that you have made the inevitable mistake.

This approach also takes into account variations in the level of difficulty of your tests and a student's preparation. In your current grading system you may assign 70% as the breaking point between a "C" and a "D", and this will be much too subjective and totally unreasonable for some exams.

An important advantage of this method is that both you and the students can have a good idea of what a student's class standing is at any time. The student's grade is determined by adding together all his McCall's T scores and dividing by the number of scores. That average is then compared with the equivalent letter grades.

The McCall's T score will "normalize" all the scores and compare the class performance as a whole against the individual scores, not some predetermined absolute. If your mathematics is strong, you can verify the algebraic manipulations from the BASIC program listing which follows. For the rest of you, you must trust that the approach calculates the class average (mean) and standard deviation. The mean is then subtracted from the individual student's score and divided by 1/10th the standard deviation. This gives a number between about –25 and +25, with most near zero. The constant 50 is then added to be sure all the numbers are positive. That is your McCall's T score. Fifty percent of the students will always have scores greater than 50. Sixty-eight percent will have scores between 40 and 60 and better than ninety-five percent of all the students will have a score between 30 and 70.

If you've ever been exposed to statistics, those numbers should look vaguely familiar. They represent 1 and 2 standard deviations from the mean. If you wanted to give no more than 15% A's, you would see that about 15% of the area in a normal curve is found above a value of 1.04 standard deviations above the mean. That would translate into a McCall's T score of 60.4 ($10 \times 1.04 + 50$). I have in the past adopted cutoffs of 30, 40, 50 and 60. That effectively gives 50% A's and B's which is in line with a community college average.

If I've convinced you to try something new, what follows are a Visicalc template and a less elegant BASIC program along with sample printouts. You will find the BASIC program easier to type in than the Visicalc template, but Visicalc is definitely the preferred way to go!

Your students, being human, will never have seen anything like this before and some will resist change. You will need to explain the procedure to them, and re-explain it. If you think the method has merit, hang in there, but expect

and be prepared for complaints. Just as there is no perfect form of government, there is no perfect grading system!

GRADING

All grade scores will be reported in terms of McCall's T score as well as the raw score.

McCall's T score is defined as follows:

$$T = 50 + 10Z$$

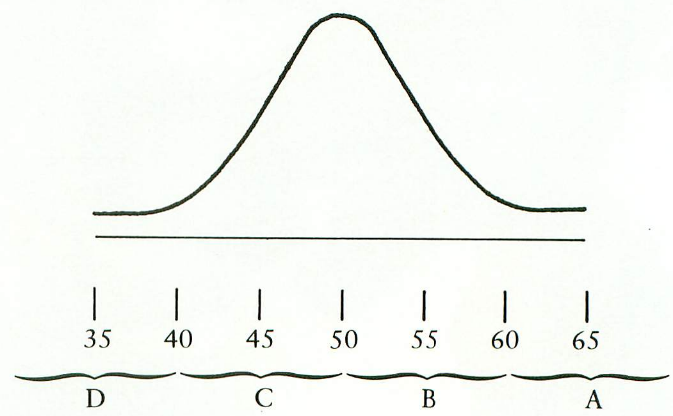
where $Z = (Y_1 - Y)/S$

and $$S = \sqrt{\frac{\sum Y_1^2 - \frac{\left[\sum Y_1\right]^2}{N}}{N-1}} \quad \text{if } N \leq 30$$

- S = sample standard deviation
- Y_1 = students raw score
- Y = class mean
- N = total sample number

therefore $T = 50 + 10(Y_1 - Y)/S$

for conversion to letter grade:



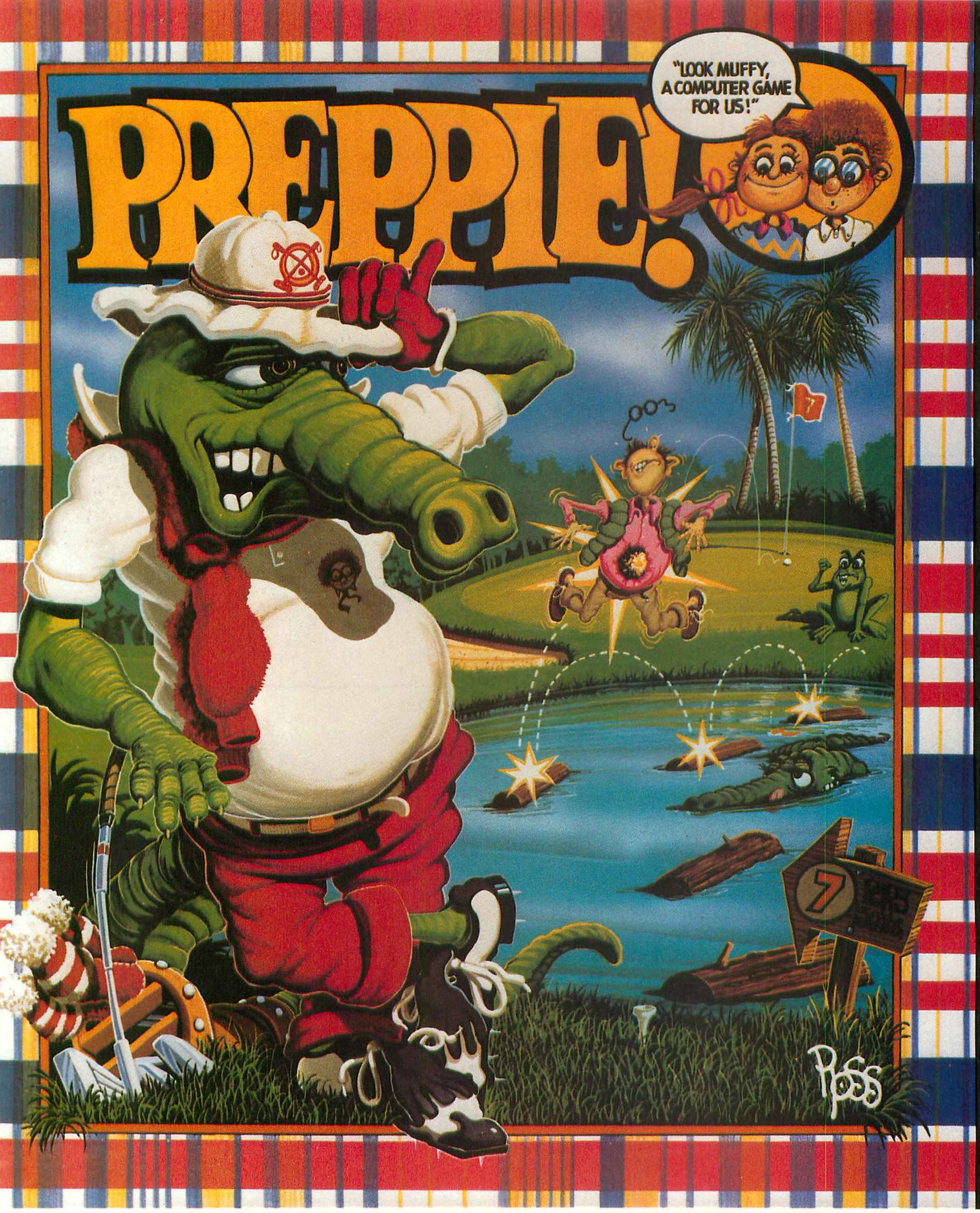
COURSE: TYPING 001 DATE: 14 FEB. 1983

STUDENT NAME	QUIZ #1 RAW SCORE	QUIZ #1 "T" SCORE
Abbey, James	42	58.79
Blake, John	34	51.37
Castro, Jessee	49	65.29
Dalton, Maria	24	42.09
Ellis, Mark	35	52.30
Felix, Gloria	26	43.95
Gallo, Joe	30	47.66
Hanes, Sam	22	40.24
Ivanovich, William	41	57.86
Jackson, Anthony	40	56.94
Kaufman, David	31	48.59
Lang, Mary	47	63.43
Malone, Kathy	22	40.24
Nguyen, Kim	32	49.51
O'Neal, Doug	12	30.96
Perez, Delores	25	43.02
Quezada, Betina	21	39.31
Reddy, Barbara	18	36.52
Sanford, Tom	41	57.86
Takahashi, Isao	41	57.86
Unger, Max	50	66.21

TOTAL	683
NUMBER	21
AVERAGE (MEAN)	32.52
STAN. DEV.	10.78
HIGH	50
LOW	12

```
10 REM WRITTEN BY CLYDE H. SPENCER
20 REM
30 REM SN$:STUDENT NAMES
40 REM RS(n):RAW SCORES
50 REM MTS(n):McCALL'S T SCORES
60 REM M:CLASS MEAN
70 REM SD:STANDARD DEVIATION
80 REM C:CONSTANT=50
90 REM
100 DIM SN$(25),RS(100),MTS(100)
110 OPEN #1,8,0,"D:NAMES.DAT"
120 TRAP 120:PRINT "NUMBER OF STUDENTS TAKING EXAM";:INPUT NUM
```

continued on page 67



PREPPIE II IS HERE!

That's right you LaCoste-clad Atari owner. Wadsworth Overcash, our Weejuned young prepster continues his exploits — this time at college and just like daddy, he's decided to pledge a fraternity. Have we got surprises for him (and you)!

AVAILABLE NOW AT FINE COMPUTER STORES EVERYWHERE

by Russ Wetmore





Good Golly! What A GAME!

The original arcade game **PREPPIE!** will give you hours of toe-tickling fun. **You** take the controls, moving your young prepster about on the golf course. And what a golf course! It's unlike any you have ever played on before. There are dangers **everywhere,** and only you can keep the little Ivy Leaguer from a fate worse then Penn State!

PREPPIE! is written in state-of-the-art machine language, is joystick compatible and fully utilizes the Atari's sound and graphics capabilities. Quite frankly, it will give you the most fun you can have on an Atari microcomputer.

PREPPIE! is available at fine computer, book, and hobby stores everywhere.

An exclusive game from

ai Adventure INTERNATIONAL

A DIVISION OF SCOTT ADAMS, INC.

To order, see your local dealer. If he does not have the program you want, then call 1-800-327-7172 (orders only) or write for our free catalog.

Published by ADVENTURE INTERNATIONAL
a division of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917

"My Atari never did things like this before!"
—Holister Townsend Wolfe

"I had so much fun I almost blew my doughnuts."
—Theodore Boston III

"I haven't had this much fun since Buffy and I went to Princeton for the weekend."
—Martha Vineyard

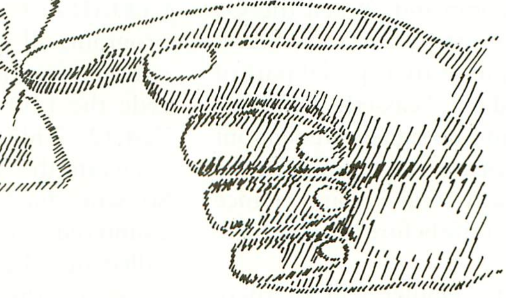
continued from page 65

```
130 LET SUM=0:LET SUM2=0:LET C=50
140 FOR N=1 TO NUM
150 PRINT "NAME";:INPUT SN$
160 TRAP 160:PRINT "RAW SCORE";:INPUT RS:LET RS(N)=RS
170 PRINT #1,SN$
180 LET SUM=SUM+RS(N)
190 LET SUM2=SUM2+RS(N)*RS(N)
200 NEXT N
210 CLOSE #1
220 TRAP 400:LET M=SUM/NUM:LPRINT " ","MEAN=";INT(100*M+0.5)/100;
230 LET SD=SQR((SUM2-(SUM*SUM)/NUM)/(NUM-1)):LPRINT " STD. DEV.=";INT(100*SD+0.5
)/100:LPRINT
240 TRAP 40000:OPEN #1,4,0,"D:NAMES.DAT"
250 FOR N=1 TO NUM
260 LET MTS(N)=C+10*(RS(N)-M)/SD
270 INPUT #1,SN$
280 LPRINT SN$,RS(N),INT(100*MTS(N)+0.5)/100
290 NEXT N
300 CLOSE #1:END
400 PRINT "TURN ON THE PRINTER!"
410 FOR DELAY=1 TO 1000:NEXT DELAY
420 GOTO 220
```

VISICALC TEMPLATE

```
>E34:@MIN(E6...E26)
>C34:"LOW
>E33:@MAX(E6...E26)
>C33:"HIGH
>E32:/F$@SQRT((G29-((E29*E29)/E30))/(E30-1))
>C32:"STAN. DEV.
>E31:/F$@AVERAGE(E6...E26)
>C31:"AVERAGE
>E30:@COUNT(E6...E26)
>C30:"NUMBER
>G29:@SUM(G6...G26)
>E29:@SUM(E6...E26)
>C29:"TOTAL
>F27:/--
>E27:/--
>D27:/--
>C27:/--
>B27:/--
>G26:+E26*E26
>F26:/F$50+(10*(E26-E31)/E32)
>B26:/FL
>G25:+E25*E25
>F25:/F$50+(10*(E25-E31)/E32)
>B25:/FL
>G24:+E24*E24
>F24:/F$50+(10*(E24-E31)/E32)
>B24:/FL
>G23:+E23*E23
>F23:/F$50+(10*(E23-E31)/E32)
>B23:/FL
>G22:+E22*E22
>F22:/F$50+(10*(E22-E31)/E32)
>B22:/FL
>G21:+E21*E21
>F21:/F$50+(10*(E21-E31)/E32)
>B21:/FL
>G20:+E20*E20
>F20:/F$50+(10*(E20-E31)/E32)
>B20:/FL
>G19:+E19*E19
>F19:/F$50+(10*(E19-E31)/E32)
>B19:/FL
>G18:+E18*E18
>F18:/F$50+(10*(E18-E31)/E32)
>B18:/FL
>G17:+E17*E17
>F17:/F$50+(10*(E17-E31)/E32)
>B17:/FL
>G16:+E16*E16
>F16:/F$50+(10*(E16-E31)/E32)
>B16:/FL
>G15:+E15*E15
>F15:/F$50+(10*(E15-E31)/E32)
>B15:/FL
>G14:+E14*E14
>F14:/F$50+(10*(E14-E31)/E32)
>B14:/FL
>G13:+E13*E13
>F13:/F$50+(10*(E13-E31)/E32)
>B13:/FL
>G12:+E12*E12
>F12:/F$50+(10*(E12-E31)/E32)
>B12:/FL
>G11:+E11*E11
>F11:/F$50+(10*(E11-E31)/E32)
>B11:/FL
>G10:+E10*E10
>F10:/F$50+(10*(E10-E31)/E32)
>B10:/FL
>G9:+E9*E9
>F9:/F$50+(10*(E9-E31)/E32)
>B9:/FL
>G8:+E8*E8
>F8:/F$50+(10*(E8-E31)/E32)
>B8:/FL
>G7:+E7*E7
>F7:/F$50+(10*(E7-E31)/E32)
>B7:/FL
>G6:+E6*E6
>F6:/F$50+(10*(E6-E31)/E32)
>B6:/FL
>F5:/--
>E5:/--
>D5:/--
>C5:/--
>B5:/--
>F4:"    "T" SCORE
>E4:"   RAW SCORE
>C4:"       NAME
>B4:"   NO.
>F3:/FL"
>E3:"        QUIZ #
>D3:"T
>C3:"        STUDEN
>B3:" STUDENT
>E1:"          DATE:
>B1:"     COURSE:
/W1
/GOR
/GRM
/GC12
/X>A26:>A45:
```

PACTL POKER



by CARL EVANS

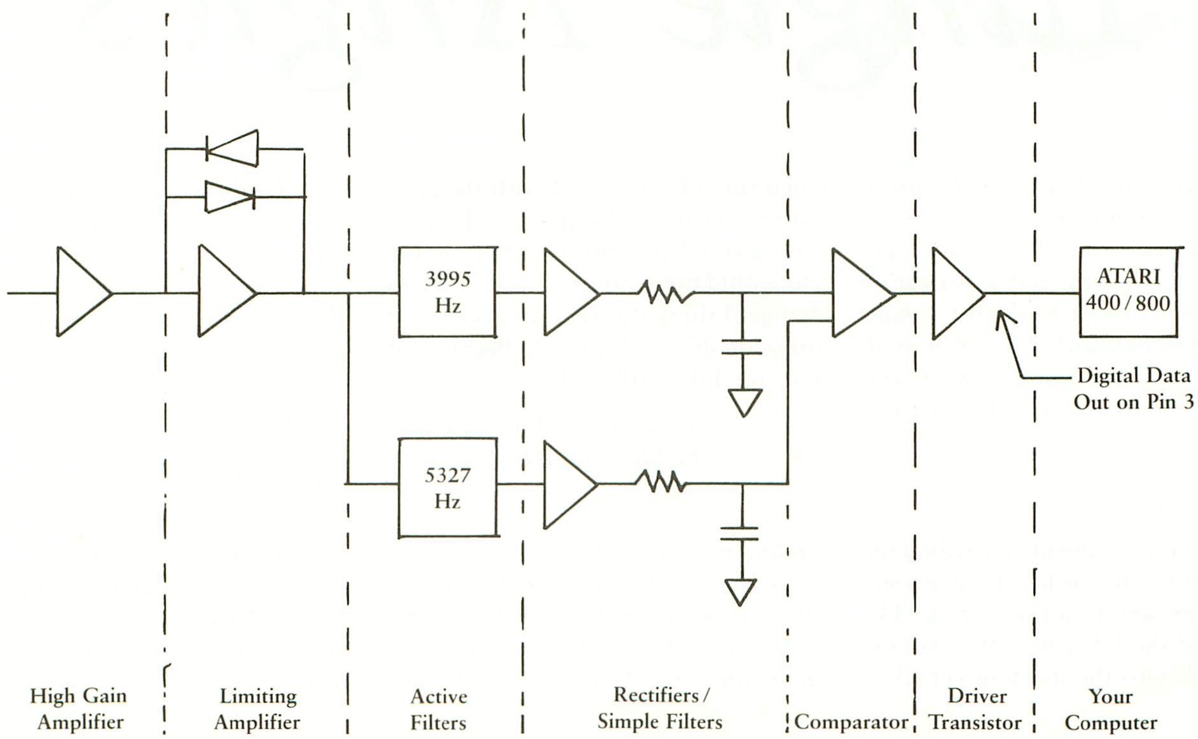
In the last two issues we discussed cassette tapes for the ATARI 410 Program Recorder and began to investigate its inner workings. This time we will delve a bit further into the playback circuit. I'll also explain why you have to press [RETURN] twice for a CLOAD or CSAVE.

Figure 1 shows a functional block diagram of the playback circuit in your 410 Recorder. The playback circuit uses an "active filter" network to separate the 3995 Hz (ZEROs) and the 5327 Hz (ONEs) and send each kind of signal down two parallel lines. The signals are then cleaned up by passing them through a simple rectifier and a filter. This "dry cleaning" leaves you with a signal that is essentially DC (constant voltage). Each of these DC signals is fed into opposite sides of a comparator, where output is further filtered and passed on to a "driving" transistor which drives the data line to your computer.

This circuit converts the Frequency Shift Keying (FSK) signals that were recorded on your tape into a binary-serial data stream for input to your computer.

The reason why two [RETURN]s must be pressed for every CLOAD or CSAVE is that the first [RETURN]

Figure 1.
ATARI 410 Recorder Playback Circuit Block Diagram



signals the Operating System (OS) to accept your command. When the OS receives a cassette LOAD or SAVE command it jumps to a special part of the OS called the "cassette handler." Up to this point, no signals are sent out from the Recorder. Atari designed the handler this way to give you a chance to prepare the tape before the Recorder is activated.

The cassette handler will sit there until it gets a second [RETURN]. When your computer is first powered up, the Motor Control Line (pin 8) of the serial bus connector is initialized in a "low" state (zero voltage). This line is connected to the motor ON/OFF control in your 410 Recorder. When you press the second [RETURN], this line is fed a positive voltage that activates the Recorder motor.

You can fool the Operating System into thinking you have already pressed [RETURN] twice. If you use a CLOAD or CSAVE command in your program, all you have to do to eliminate the second [RETURN] is to precede the I/O command with POKE 764,12. This POKEs a [RETURN] code into the "last key pressed" buffer. So, when the CLOAD command is encountered and the cassette handler is called up, the [RETURN] is already there for the cassette handler. The computer will beep at you normally, but the CLOAD or CSAVE operation will begin *immediately.*

Another trick POKE lets you turn the cassette motor ON and OFF under software control. POKE 54018,52 will turn the Recorder's motor ON and POKE 54018,60 will turn it back OFF. Location 54018 is called PACTL. This PACTL trick will allow you to listen to a cassette tape without actually trying to CLOAD it. I use this capability to locate the start of a file on a tape. For example, I had one adventure game program that I could not set to load. Finally I tried the PACTL trick to see if there even *was* a file on the tape! I found the file way out at a tape counter value of 68, and it loaded fine once I found it. You could also POKE PACTL to listen to music over your TV speaker, or even to activate a special controller to operate household appliances.

Next issue I will give you the schematic diagram for the 410, along with a parts list, and identify a few key components that you can replace to improve the reliability of your CLOADs.

Your letters have been pouring in. There is not enough time to answer all of you individually. Those of you who have really serious problems, I will try to answer with a letter.

Tangle Angles

Here begins our clinic on tape problems, in response to your letters as invited in past issues. I regret we can't cover more this time, but at least it's a start. Some urgent problems I have answered individually by return mail. We expect to devote more space to this feature in future issues. —Carl Evans.

Dear Mr. Evans:

You asked for comments regarding the 410 Program Recorder. I have one, which at present is not operating. The left side of the lid, where the arm extends back into the machine, cracked when the lid was raised with the eject button. A call to Chicago revealed that they wanted $40.00 as a flat charge and would not send a new lid for me to change. I think this is unnecessary and unreasonably high-priced. Because of that, my lid is still broken.

Thomas A. Mabel, M.D.
Noblesville, IN

Finding replacements for 410 Recorder parts is no easy task. I finally located one source at the Foothill Computer Center in Upland, California. They are an authorized Atari Service Center and should be able to supply you with virtually any Atari component you might need. I asked them specifically about your broken lid and they said they would send you one for about $7 plus shipping. Their address is:

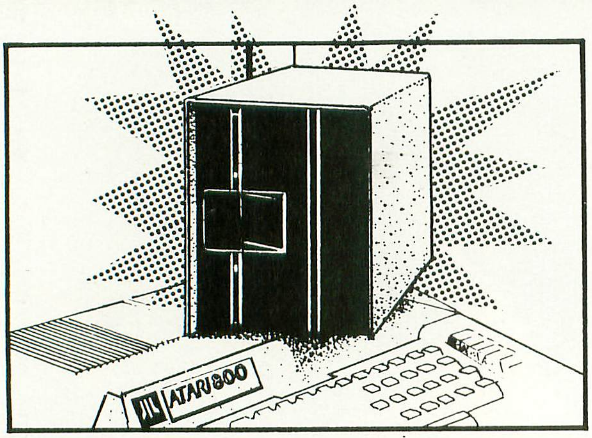
Foothill Computer Center
Attn: Mr. Jim Degner
949 W. Foothill Blvd.
Upland, CA 91786
(714) 985-3278

If you, or any of you other readers, know of a good source for parts near to you, then send their name, address, and phone number to me so I can spread the word.


"...faithfully captures the look, spirit and play of arcade 'Space Invaders'".
-John Anderson, Creative Computing
"All are excellent versions of the arcade games with super graphics and sound."
-Mark Benioff A.N.A.L.O.G.
"The graphics display, sounds and game logic are so close to the original, that you might find yourself looking for the coin slot on your computer."
-Gary and Marcia Rose
"'Deluxe Invaders' is by far the best Space Invaders program ever released for a personal computer."
-Leigh Goldstein, Electronic Games
MIDWAY
Wizard of Wor
Deluxe Invaders
GORF
Roklan Software
We are Serious About Our Games!

Access Drives for the Atari® — Why settle for less!

GET THE MOST OUT OF YOUR ATARI® COMPUTER. GET AN ACCESS UNLIMITED MINI-DISK DRIVE.



Store twice as much information

With an Access Unlimited drive, you can store almost twice as much information on a diskette as you can with an Atari 810™.

Our system has double-density storage. Which lets you store system and application programs on one diskette and still have room for data files.

You save $$

You save on the cost of diskettes — because you don't need as many.

You may also need fewer disk drives because our Access drives are double-density and, unlike the Atari 810, our controller can handle up to 4 drives.

Furthermore, our add-on drives do not require their own controllers. They're less complicated. They cost less. And they're more reliable.

Now Available!

Access single density drives. 102k storage but much cooler, quieter and more efficient than the 810!

Enjoy more flexibility

Our flexible drives let you cable your first-drive system directly into your computer. Or go through an 810 drive.

And our Access controllers automatically handle single- and double-density drives in the same system.

Order today. Satisfaction guaranteed.

ATAR88-1	first drive single density	**$488.00**
ATAR88-A1	Add on drive single density	**$379.95**
ATAR40-1	First drive double density	**$624.95**
ATAR40A1	Add on drive double density	**$388.00**
ATARISEP		**$24.95**

SPECIALS

Flip-N-File — holds 50 diskettes

	5¼″	Reg. $34.95	**Now only $19.95**
	8″	Reg. $49.95	**Now only $28.95**
Head Cleaning Kit		Reg. $29.95	**Now only $19.95**
Green Screen		Reg. $24.95	**Now only $12.95**
Drive Numbering Tabs		Reg. $4.50	**Now only $3.95**
Library Cases Holds 10 Diskettes			**Now only $2.95 ea**

We have just added approximately $250,000 worth of brand new business and game software.

New! 5¼″ Soft Sector Diskettes W/Hub Ring

BASF	Lifetime Limited Warranty Discs. SSDD	$24.90	Box of 10
ATHANA	1 yr. Limited Warranty Discs. SSSD	$19.90	Box of 10

To order, call TOLL-FREE

1 (800) 527-3475 VISA master charge

Ordering Information

Order by phone or by mail. We accept Visa, MasterCard, cashier's checks, certified checks, and money orders. With personal checks, allow additional time for bank clearance. Your bankcard will not be charged until your order is shipped. On orders over $1,000, we pay freight (surface only) and insurance; please add $3.00 shipping and handling under 50 lbs. Over 50 lbs., add $5.00 for orders under $1,000.00. Texas residents add 5% sales tax. Allow 2 to 4 weeks for delivery.

LIMITED QUANTITIES • Prices subject to change without notice.

☐ Please send me a FREE catalog. I'm not ready to order at this time.
☐ YES, I'm taking advantage of your Sales prices.

Name ____________________
Company Name ____________________
Address ____________________
City ____________ State ______ Zip ______
Phone Number (   ) ____________________

Quantity	Item	Unit Price	Subtotal
		Subtotal	
		State Sales Tax (Texas residents only)	
		handling charge	
		Total	

Check one:
☐ payment enclosed ☐ Visa ☐ MasterCard*

*If MasterCard, numbers above name:

Expiration Date: ☐☐ — ☐☐

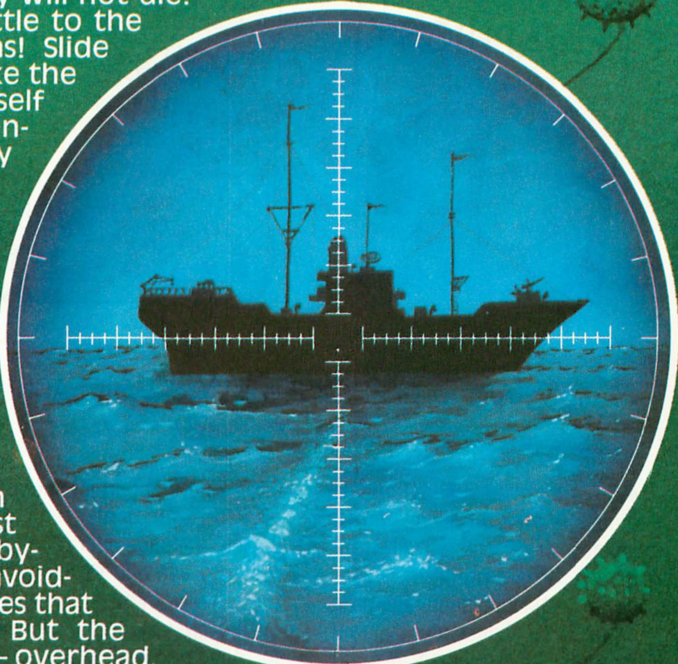
Authorized signature, if charged

ACCESS UNLIMITED

Dept. F2/401 N. Central Expwy. #600/Richardson, Texas 75080
Tel 1-800/527-3475 214/340-5366
214/690-0207 Sat. and Evenings Only

ABSOLUTELY RELENTLESS

The challenge of inner space — the fury of an enemy that seemingly will not die. This is SEA DRAGON — a battle to the death **under** the high seas! Slide into the Captain's chair, take the controls and prepare yourself for the most incredible non-stop action this side of Davy Jones' locker. SEA DRAGON puts you in control of a nuclear sub that's armed from stem to stern with enough firepower to take on King Neptune himself — and you'll need every missile, every torpedo, and every scrap of skill you can muster to survive.



The object of SEA DRAGON is to successfully navigate your sub through an underwater course past mountains and through labyrinthine passageways while avoiding clusters of explosive mines that rise from the seabottom. But the danger doesn't stop there — overhead, surface destroyers lace the water with depth charges; below, deadly attack bases and arcing lasers cut a killing swath that could reduce your sub to bubbling slag. But even these potentially lethal perils are dwarfed by the awesome menace that awaits you at the course's end.

SEA DRAGON — every possible "extra" is here to ensure your playing pleasure: exciting sounds, high score save, machine language graphics and an eye-popping scrolling seascape that extends the equivalent of over two dozen screens placed end-to-end, providing a diverse and unique challenge that will not diminish after repeated playings.

Nothing you've ever seen on your micro could possibly prepare you for this! You are ready now, ready for the ultimate in undersea action with a pace that is absoutely unyielding. SEA DRAGON — the arcade has finally come home.

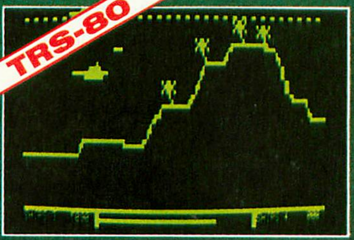
FOR THE APPLE by John Anderson



FOR THE ATARI by Russ Wetmore



FOR THE TRS-80 by Wayne Westmoreland & Terry Gilman

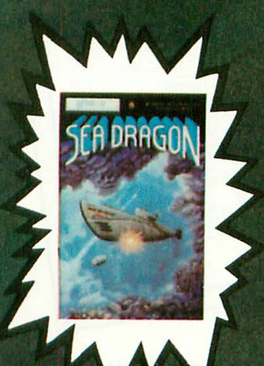


ALL VERSIONS ARE JOYSTICK COMPATIBLE!



SEA DRAGON FEATURES

- Fantastic Scrolling Seascape
- Nearly Limitless Game Challenge
- High Score Save (disk version)
- Terrific Sound Effects
- Arcade Action Graphics™
- Apple version "talks" without special hardware!



ORDERING INFORMATION

APPLE 2 or APPLE 2 PLUS 48K Disk (DOS 3.3 required)
042-0146 .... $34.95

ATARI 32K Disk
052-0146 .... $34.95

ATARI 16K Tape
051-0146 .... $34.95

TRS-80 32K Disk
012-0146 .... $24.95

TRS-80 16K Tape
010-0146 .... $24.95

Adventure International
A DIVISION OF SCOTT ADAMS, INC
PRICES SUBJECT TO CHANGE

To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog.

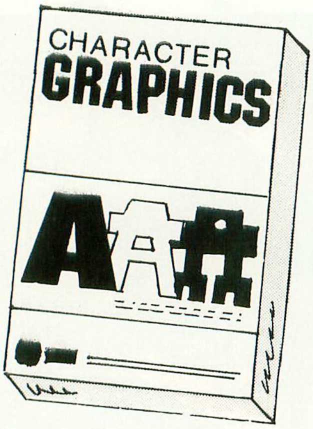
Published by ADVENTURE INTERNATIONAL
a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 830-8194

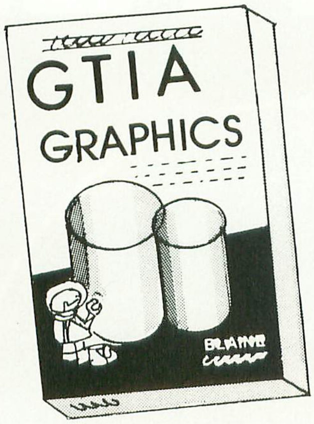
EDUCATIONAL SOFTWARE

PROUDLY PRESENTS

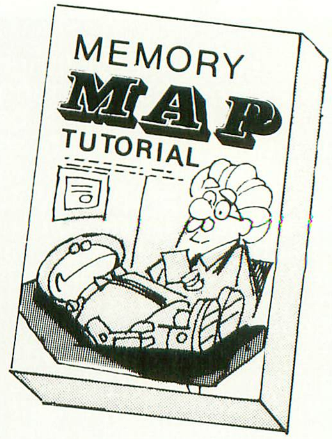
TRICKY TUTORIALS™ 8 Thru 11

FOR ATARI® COMPUTERS









16K TAPE OR 32K DISK ONLY $29.95 EACH!

#8 - Create and animate your own character sets using the same methods used in many of your favorite games. Includes a great editor, utilities, examples, and a complete Space Invaders look-alike, all explained in detail.

#9 - Learn to use Graphics modes 9, 10 & 11 giving you 16 shades or 9 colors, all from BASIC. Create programs never before possible such as three dimentional shapes and digitized pictures, all explained in great detail.

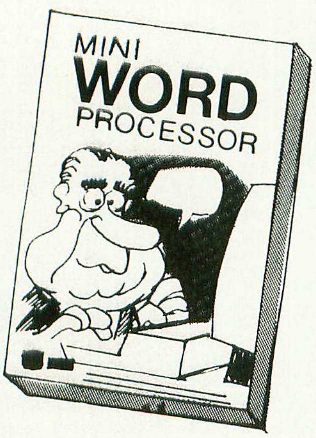
#10 - Find that perfect sound effect for your games and programs. Includes over 50 effects ready to use and explains how they were written. Special utilities are included to allow you to develop your own sound effects.

#11 - Our famous Memory Map now COMES ALIVE in this TUTORIAL. Included are thirty of the most useful POKE locations within the ATARI, each fully explained with interactive examples. See the tricks you have always heard about.

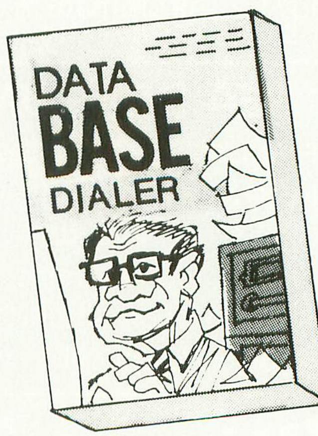
PROGRAM EXCHANGE
EDUCATIONAL SOFTWARE inc.

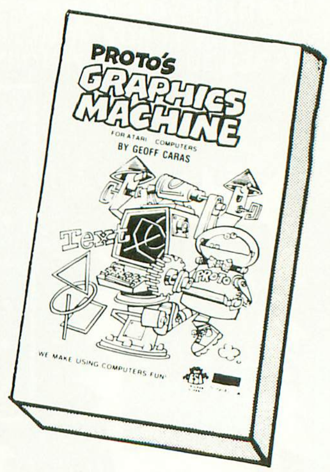
OUR NEW PROGRAM EXCHANGE

FEATURING THE FINEST PROGRAMS
FROM AUTHORS AROUND THE WORLD:

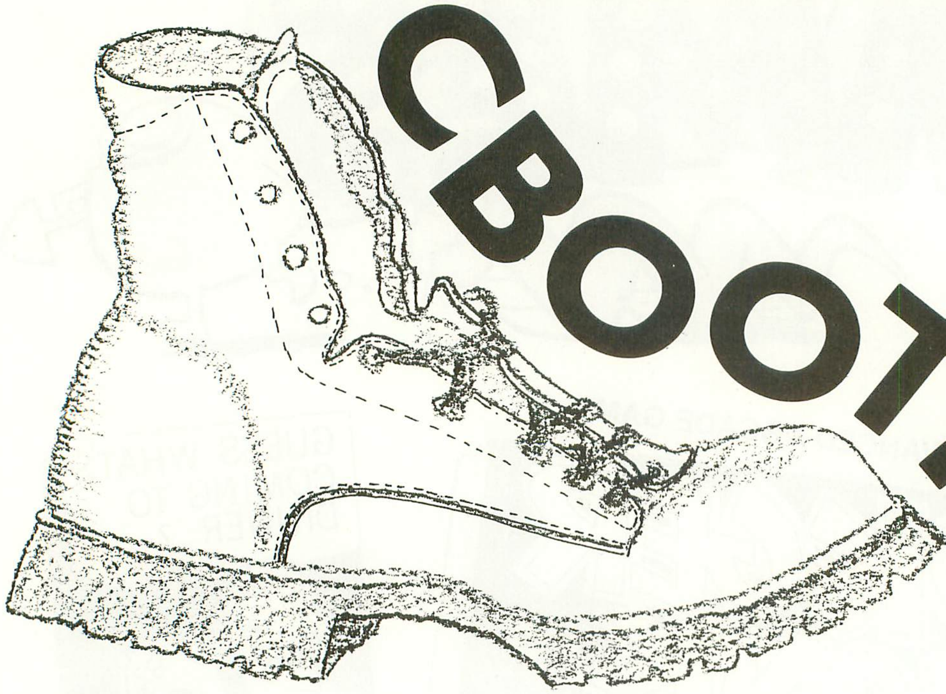








THE ESI PROGRAM EXCHANGE OFFERS A $24.95 WORD PROCESSOR (TAPE OR DISK), A $19.95 GRAPHICS TOOL THAT USES SINGLE WORD COMMANDS, A FAMOUS CHARACTER EDITOR FOR ONLY $19.95, A DATABLE PROGRAM ($24.95) THAT ACTUALLY DIALS YOUR PHONE AS WELL AS KEEP YOUR RECORDS, AND OVER 20 MORE!



CBOOTMGR

by HARALD STRIEPE

Most ATARI owners start out with a cassette-based system. CASSETTE BOOT MANAGER will help you make backups of your single-stage boot tapes, and permit you to convert them to boot disks later on. The program also includes two general, *relocatable* subroutines important for handling Input/Output thus overcoming the most significant shortfalls of Atari's 8K BASIC.

Sectors on single-density disk drives contain the same number of bytes (128) as the "records" of the cassette system. Each cassette record is separated from the next by a recording gap, which also contains a marking tone. This tone makes it possible for the ATARI to adjust its receiving procedure to match the varying speed of the cassette recorder.

There are two kinds of gaps, long and short (LIRG and SIRG). You might have encountered these when you used CSAVE (SIRG) or SAVE "C:" (LIRG). The two methods store information identically, the only difference is the gap length between each record LIRG is long enough to permit recorder motor to stop completely, while SIRG needs the motor to keep running.

Obviously, lead tones and gaps are not used with the disk drive. The drive receives an instruction to read or write a particular sector, and it executes that instruction on its own.

There are, however, a number of different kinds of information storage in the ATARI system. BASIC LISTed files, Assembler source files, and the textfiles of a number of word processors simply contain the ATASCII characters of that file all in a row. BASIC SAVEd files contain the tokenized statements (which look meaningless without the action of the BASIC cartridge), and related tables. DATA files contain numbers in either listed or binary form, depending on how they were stored. Binary files contain the binary information stored directly, with a header indicating the nature of the file and the starting and ending address where the file is to be located.

On cassette, this information is *sequentially* sent out over the serial bus, but the disk drive is a random-access device that allows named files (e.g., "D1:MYPROG.BAS"). So, the filemanager (FMS) part of the Disk Operating System (DOS), has to organize all the sectors in some way. One aspect of DOS is that each sector contains a three-byte link pointing to the next sector in the file, giving the file number in the directory, and counting the number of bytes actually in use in that sector. This means that in the standard disk file each sector has only 125 bytes available.

Since we normally use CIO, ATARI's most intelligent I/O system, we are not usually aware of what is happening. BASIC in all its I/O functions utilizes CIO. Besides opening and closing files, it controls the STATUS function, "record"– related I/O (a record is terminated by a carriage return: $9B) in INPUT and PRINT, and single-byte organized I/O in PUT and GET.

One function *not* supported by BASIC is the BLOCK I/O. Just as in PUT or GET, BLOCK I/O does not care at all about the content of the transfer, it just wants the buffer address for the file and its length. BASIC does use it for SAVE and LOAD functions, and the DUP.SYS part of DOS supports it in numerous ways, like BINARY LOAD or SAVE. But otherwise you cannot use it for your program from 8K Atari's BASIC (Note: OSS BASIC A+ users are provided with that capability).

BOOT records are structured differently, although they still adhere to 128-byte sector and record system. The actual layout of a boot file is very similar between cassette and disk. This is where our advantage is gained. A boot file is nothing more than all the binary information in a row (usually a

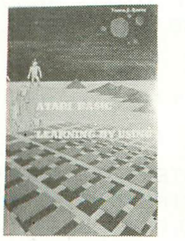
continued on page 78

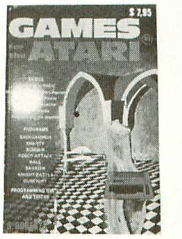
PRODUCTS FOR ATARI* 400/800 FROM ELCOMP

BOOKS:

ATARI BASIC – Learning by Using
An excellent book for the beginner. Many short programs and learning exercises. All important features of the ATARI computers are described (screen drawings, special sounds, keys, paddles, joysticks, specialized screen routines, graphics, sound applications, peeks, pokes, and special stuff). Also suggestions are made that challenge you to change and write program routines.
Order #164 — $7.95

Games for the ATARI Computer
This book describes advanced programming techniques like player-missile-graphics and use of the hardware-registers. Contains many ready to run programs in BASIC and one called GUNFIGHT in machine language.
Order #162 — $7.95





Programming in 6502 Machine Language on your PET+CBM
2 complete Editor/Assemblers (Source code 3 hexdump + description plus a powerfu. machine language monitor (Hexdump)).
Order #166 — $19.95

How to program your ATARI in 6502 machine language
Introduction to machine language for the BASIC programmer
Order #169 — $9.95

SOFTWARE IN BASIC FOR ATARI

Invoice Writing for Small Business
This program makes writing invoices easy. Store your products in DATA statements with order-number, description, and price. The program later retrives the description and price matching to the entered order-number. The shipping cost and the discount may be calculated automatically depending on the quantity ordered or entered manually. The description to the program tells you how to change the program and adapt it to your own needs. Comes with a couple of invoice forms to write your first invoices on to it.

Order #7201	cassette version	$29.95
Order #7200	disk version	$39.95

Mailing List
This menu driven program allows the small business man to keep track of vendors and customers. You can search for a name or address of a certain town or for an address with a certain note. 50 addresses are put into one file.

Order #7212	cassette version	$19.95
Order #7213	disk version	$24.95

Inventory Control
This program is menu driven. It gives you the following options: read/store data, define items, entry editing, inventory maintenance (incoming-outgoing), reports. The products are stored with inventory number, manufacturer, reorder level, present level, code number, description.

Order #7214	cassette version	$19.95
Order #7215	disk version	$24.95

Programs from Book #164
The programs from book no. 164 on cassette. (Book included)
Order #7100 — $29.00

Game Package
Games on cassette. (Bomber, tennis, smart, cannon fodder, etc.)
Order #7216 — $9.95



Microcomputer Hardware Handbook (845 pages)
Descriptions, pinouts and specifications of the most popular microprocessors and support chips.
A MUST for the hardware buff.
Order-No. 29
$14.95

Care and Feeding of the Commodore PET
Eight chapters exploring PET hardware. Includes repair and interfacing information. Programming tricks and schematics.
Order #150 — $9.95

HOFACKER

Payment: check, money order, VISA, MASTER-CHARGE, Euroscheck.
Orders from outside USA: add 15% shipping. CA residents add 6.5% tax
*ATARI is a registered trademark of ATARI Inc.
*VIC-20 is a registered trademark of Commodore

ELCOMP PUBLISHING, INC
53 Redrock Lane
Pomona, CA 91766
Phone: (714) 623 8314

Books + Software for ATARI VIC-20 OSI SINCLAIR TIMEX

SOFTWARE IN MACHINE LANGUAGE for ATARI

ATMONA-1
This is a machine language monitor that provides you with the most important commands for programming in machine-language. Disassemble, dump (hex and ASCII), change memory location, block transfer, fill memory block, save and load machine-language programs, start programs. Printer option via three different interfaces.

Order #7022	cassette version	$19.95
Order #7023	disk version	$24.95
Order #7024	cartridge version	$59,00

ATMONA-2
This is a tracer (debugger) that lets you explore the ATARI RAM/ROM area. You can stop at previously selected address, opcode, or operand. Also very valuable in understanding the microprocessor. At each stop, all registers of the CPU may be changed. Includes ATMONA-1.

Order #7049	cassette version	$49.95
Order #7050	disk version	$54.00

ATMAS
Macro-Assembler for ATARI-800/48k. One of the most powerful editor assemblers on the market. Versatile editor with scrolling. Up to 17k of source-Code. Very fast, translates 5k source-code in about 5 seconds. Source code can be saved on disk or cassette. (Includes ATMONA-1)

Order #7099	disk version	$89.00
Order #7999	cartridge version	$129.00

ATAS
Same as ATMAS but without macro-capability. Cassette-based.

Order #7098	32k RAM	$49.95
Order #7998	48k RAM	$49.95

ATEXT-1
This wordprocessor is an excellent buy for your money. It features screen oriented editing, scrolling, string search (even nested), left and right margin justification. Over 30 commands. Text can be saved on disk or cassette.

Order #7210	cassette version	$29.95
Order #7216	disk version	$34.95
Order #7217	cartridge version	$69.00

GUNFIGHT
This game (8k machine-language) needs two joysticks. Animation and sound. Two cowboys fight against each other. Comes on a bootable cassette.
Order #7207 — $19.95

FORTH for the ATARI

FORTH from Elcomp Publishing, Inc. is an extended Fig-Forth-version, Editor and I/O package included. Utility package includes decompiler, sector copy, Hex-dump (ASCII), ATARI Filehandling, total graphic and sound, joystick program and player missile. Extremely powerful!
Order #7055 — disk — $39.95

Floating point package with trigonometric functions (0 – 90°).
Order #7230 — disk — $29.95

Learn-FORTH from Elcomp Publishing, Inc.
A subset of Fig-Forth for the beginner. On disk (32k RAM) or on cassette (16k RAM).
Order #7053 — $19.95

Expansion boards for the APPLE II



The Custom Apple + Other Mysteries
A complete guide to customizing the Apple Software und Hardware
Order-No. 680 — $24.95

We also stock the boards which are used in the book "The Custom Apple . . . " (barebords)

6522 I/O Board	No. 605	$39.00
EPROM Burner	No. 607	$49.00
8K EPROM/RAM Board	No. 609	$29.00
Prototyping board for the Apple II	No. 604	$29.00
Slot repeater board for the Apple II	No. 606	$49.00

Order two boards and get the book free !

COMING SOON ! ORDER NOW !

A Look in the future with your ATARI
(Astrology and how to do your own horoscope on the ATARI 800. **Order No. 171 — $9.95**

FORTH on the ATARI – Learning by Using
Order No. 170 — $7.95

Hardware – ADD–ONS for ATARI

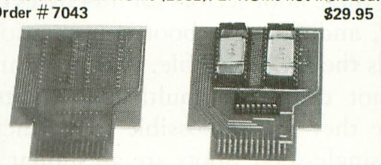
PRINTER INTERFACE
This construction article comes with printed circuit board and software. You can use the EPSON printer without the ATARI printer interface. (Works with gameports 3 and 4).
Order #7211 — $19.95

RS-232 Interface for your ATARI 400/800
Software with connector and construction article.
Order #7291 — $19.95

EPROM BURNER for ATARI 400/800
Works with gameports. No additional power supply needed. Comes compl. assembled with software (2716, 2732, 2532).
Order #7042 — $179.00

EPROM BURNER for ATARI 400/800 KIT
Printed circuit board incl. Software and extensive construction article.
Order #7292 — $49.00

EPROM BOARD (CARTRIDGE)
Holds two 4k EPROMs (2532). EPROMs not included.
Order #7043 — $29.95



EPROM BOARD KIT
Same as above but bare board only with description.
Order #7224 — $14.95

ATARI, VIC-20, Sinclair, Timex and OSI

New – for your ATARI 400/800
Astrology and Biorythm for ATARI (cass. or disk).
Order #7223 — $29.95
Birth control with the ATARI (Knaus Ogino)
Order #7222 — cass. or disk — $29.95

Books + Software for VIC-20 (requires 3k RAM Exp.)

#4870	Wordprocessor for VIC-20, 8k RAM	$19.95
#4883	Mailing List for VIC-20, 16k RAM	$14.95
#141	Tricks for VICs - The VICstory Progr.	$9.95
#4880	TIC TAC VIC	$9.95
#4881	GAMEPACK I (3 Games)	$14.95
#4885	Dual Joystick Instruction	$9.95

INPUT/OUTPUT Programming with your VIC
Order #4886 — $9.95

#4896	Miniassembler for VIC-20	$19.95
#4881	Tennis, Squash, Break	$9.95
#4894	Runfill for VIC	$9.95

Universal Experimenter Board for the VIC-20
(Save money with this great board). This board plugs right into the expansion slot of the VIC-20. The board contains a large prototyping area for your own circuit design and expansion. The construction article shows you how to build your own 3k RAM expander and ROM-board.
Order #4844 — $18.95

Software for SINCLAIR ZX-81 and TIMEX 1000

#2399	Machine Language Monitor	$9.95
#2398	Mailing List	$19.95

Programming in BASIC and machine language with the ZX-81 (82) or TIMEX 1000.
Order #140 — (book) — $9.95

Books for OSI

#157	The First Book of Ohio	$7.95
#158	The Second Book of Ohio	$7.95
#159	The Third Book of Ohio	$7.95
#160	The Fourth Book of Ohio	$7.95
#161	The Fifth Book of Ohio	$7.95
#151	8K Microsoft BASIC Ref. Man.	$9.95
#152	Expansion Handbook for 6502 and 6802	$9.95
#153	Microcomputer Appl. Notes	$9.95

Complex Sound Generation
New revised applications manual for the Texas Instruments SN 76477 Complex Sound Generator.
Order #154 — $6.95

Small Business Programs Order #156
Complete listings for the business user. Inventory, Invoice Writing, Mailing List and much more. Introduction to Business Applications. **$14.90**

CBOOTMGR *continued from page 76*

machine-language program), preceded by a header. The header contains information about the number of records in the file, the starting address where the program is to be moved, and the initialization address where the Operating System is to jump during [RESET] and after boot continuation. It will then load the indicated number of sectors or records into memory, and jump to continuation right after the header.

If it is a single-stage boot, the continuation will only set memory limits and DOS vectors, stop the cassette motor to overcome a bug in OS, set the CARRY flag if everything is okay, and return. Multiple-stage boots do not simply return, but continue the loading process. For example, DOS uses only three boot sectors for 384 bytes of info, and then the boot continuation loads the DOS.SYS file. Our program cannot deal with multi-stage boots, since they are impossible to predict, but single-stage boots are all similar.

So, to copy a cassette all we have to do is pull the cassette boot into a buffer, and then write it out to cassette again. To copy to disk, write the buffer one sector after another as a simple boot record, starting at sector 1. Note: the disk will not be a DOS disk, just as most game disks are not. Since single-stage cassette- and disk-boot look the same, it ought to work. Right, but there is one difficulty.

GET or PUT are much too slow to deal with the SIRG used by the cassette boot file. INPUT or PRINT would work, but the first time they encounter a $9B (carriage return) they return unpredictably. Thus, we must implement a machine-language call. The routine provided in lines 2000 to 2100 does just that. It can be POKEd into a string, since it is relocatable. You simply OPEN and CLOSE in a normal way, and use the subroutine instead of PUT or GET. Note that in the OPEN call for the cassette, we have the auxiliary information 128 (Line 3210), this sets up CIO for SIRG. In the USR call, we have to supply the CHANNEL (e.g. OPEN #1 –), and we have to state whether we want to PUT or GET with number 7 or 11. We also supply the buffer address, and length, since this is required for BLOCK I/O.

The routine will return a 0, if you did not supply the right number of parameters. Under CIO, a 1 is the code for successful completion. If you loaded a file, and your buffer was larger than the length of the file required, the USR call will return with a 136. This is fine, since that tells you to look at locations 203 and 204 for the actual length (number of bytes) of the file you just loaded (your friendly subroutine placed it there.) From BASIC, a LENGTH=PEEK(203)+256* PEEK(204) will return the answer. Oh, yes, if your call ERROR=USR . . . , then naturally, ERROR will be equal to the codes I just described.

This takes care of the cassette, but the boot disk does not use CIO, and its 128-byte sector format precludes use of the FMS, anyway. We have to call the disk handler, with lines 1000 to 1140. Disk I/O always happens in 128-byte blocks, so adjust for that. Since CIO is not used, no files have to be opened or closed, but error codes (except for end-of-file, of course) are the same. The routine is general enough so you can read as well as write.

Since BASIC itself takes up a rather large space, the program is divided into two parts to give you a maximum-size buffer. To make it self-loading, save both parts with 'LIST "C:", then a simple RUN"C:" from BASIC will set up your system. It will load both parts, if you add this line—325 POKE 764,12 (as if you were hitting [RETURN] upon the second RUN "C:"). The double BEEP from the cassette-open command will call you when the system is ready.

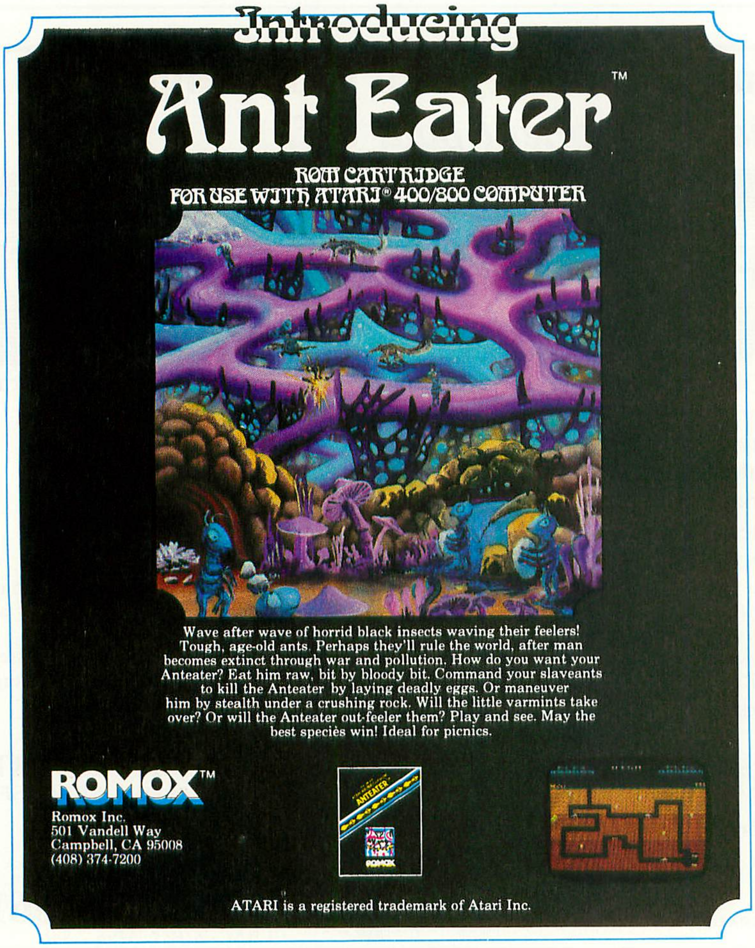
CBOOTMGR not only does the job of commercial programs costing $20 or more, but it also gives you some handy subroutines for fast and unusual I/O from BASIC. Good luck, and if you have questions or comments, write to me c/o ANTIC.

```
10 REM CASSETTE BOOT MANAG
   ER VERS.2.0
20 REM
25 REM BY H.E.STRIEPE  13J
   UL82
30 REM
35 REM THIS PROGRAM IS IN
   THE PUBLIC
40 REM DOMAIN, FURTHER DIS
   TRIBUTION
42 REM MUST CONTAIN THIS R
   EFERENCE !
45 REM
46 REM WRITTEN FOR ANTIC,
47 REM THE ATARI RESOURCE,
48 REM AND FRIENDS
49 REM
50 REM
51 REM >>>THIS IS PART A <
   <<
52 REM
55 REM NOTE:  THIS PROGRAM
    CONTAINS
60 REM RELOCATABLE SUBROUT
   INES THAT
65 REM CAN BE USED FOR GEN
   ERAL I/O
70 REM FROM BASIC AND BASI
   C A+.
75 REM ( THE LATTER ALREAD
   Y HAS A
80 REM FAST BINARY LOAD RO
   UTINE ).
81 REM THESE SUBROUTINES C
   OULD ALSO
82 REM BE STORED IN STRING
   S.
83 REM
85 REM
86 REM TO ENHANCE SPACE UT
   ILIZATION,
87 REM THIS PROGRAM IS IN
   TWO PARTS.
88 REM THIS PART A IS FOR
   SET-UP OF
90 REM SUBROUTINES, PART B
    DOES THE
91 REM ACTUAL WORK; OTHER
   SCHEMES ARE
92 REM POSSIBLE. FOR CASS.
    VERSIONS,
93 REM PART B SHOUD BE SAV
   ED WITH
94 REM 'SAVE "C:". COMPATA
   BILITY WITH
95 REM BASIC A+ HAS BEEN R
   ETAINED.
96 REM
99 REM
200 REM THIS ROUTINE SETS U
    P SCREEN
210 REM
220 GRAPHICS 0:POKE 710,146
    :POKE 712,144:POKE 752,
    1:? :? "CASSETTE BOOT M
    ANAGER        VERS.2.0"
230 ? "by H.E.STRIEPE 1982"
    :?
240 ? :? :? :? :? "This pro
    gram permits the duplic
    ation  of privately own
    ed single-stage"
```

continued on page 80

CBOOTMGR *continued from page 78*

```
250 ? "cassette boot tapes
    to cassette or":? "disk
    .":? :?
260 ? "      DO NOT USE TO IL
    LEGALLY COPY
     COPYRIGHTED MATERIAL !
    !!        "
270 POKE 703,4:REM OPEN UP
    BOTTOM WINDOW
299 REM
300 REM NOW WE LOAD SUBROUT
    INES, AND
301 REM CALL THE COMPANION
    PROGRAM
302 REM
305 ? CHR$(125):? "LOADING
    MACHINE LANGUAGE ROUTIN
    ES..."
310 GOSUB 1010:GOSUB 2010
320 ? CHR$(125):? "LOADING
    MAIN PROGRAM..."
325 REM POKE 764,12 for CAS
    SETTE vers.
330 RUN "D:CBOOTMGB":REM <<
    << CHANGE  TP 'RUN "C:"
     ' FOR CASSETTE VERSION
       NOTE: CBOOTMGB must
    have been saved
340 REM with ' SAVE "C:" '
999 REM
1000 REM THIS SUBROUTINE ADD
     S DISK
1002 REM HANDLER ROUTINE EXP
     ECTING
1003 REM DISK DEV#,DISK COMM
     AND
1004 REM (ASC("w") OR ASC("R
     )),start
1005 REM SECTOR,SECT COUNT,B
     UFFER ADD
1006 REM AS USR CALL ARGUMEN
     TS
1007 REM
1010 SUBSTART=1600:SUBEND=16
     82
1020 FOR X=SUBSTART TO SUBEN
     D
1030 READ Y:POKE X,Y:NEXT X
1040 DATA 32,68,218,104,201,
     5,208,74
1050 DATA 104,104,141,1,3,10
     4,104,141
1060 DATA 2,3,104,141,11,3,1
     04,141
1070 DATA 10,3,104,133,204,1
     04,133,203
1080 DATA 104,141,5,3,104,14
     1,4,3
1090 DATA 32,83,228,48,35,17
     3,4,3
1100 DATA 24,105,128,141,4,3
     ,173,5
1110 DATA 3,105,0,141,5,3,23
     8,10
1120 DATA 3,208,3,238,11,3,1
     98,203
1130 DATA 208,222,198,204,16
     ,218,160,1
1140 DATA 132,212,96
1150 RETURN
1999 REM
2000 REM BINARY PUT/GET SUBR
     OUTINE
2002 REM LOAD ROUTINE EXPECT
     ING I/O
2003 REM CHAN.,COMMAND(7-GET
     ,11-PUT),
2004 REM BUFF ADD,BUFF LENGT
     H
2005 REM AS USR CALL ARGUMEN
     TS
2006 REM GET COMMAND RETURNS
      FILE
2007 REM LENGTH IN $CB & $CC
      (203/204)
2008 REM
2010 SUBSTART=1700:SUBEND=17
     51
2020 FOR X=SUBSTART TO SUBEN
     D
2030 READ Y:POKE X,Y:NEXT X
2040 DATA 32,68,218,104,201,
     4,208,43
2050 DATA 104,104,10,10,10,1
     0,170,104
2060 DATA 104,157,66,3,104,1
     57,69,3
2070 DATA 104,157,68,3,104,1
     57,73,3
2080 DATA 104,157,72,3,32,86
     ,228,132
2090 DATA 212,189,72,3,133,2
     03,189,73
2100 DATA 3,133,204,96
2110 RETURN
```



TYPO TABLE

Variable checksum = 537508

Line num range	Code	Length
3000 - 3150	TG	228
3160 - 3260	VD	532
3270 - 3510	VT	330
3520 - 3640	UC	445
3650 - 3790	NC	440
3800 - 4090	AG	450

```
3000 REM THIS IS PART B OF C
     BOOTMGR
3010 REM
3020 REM VERS.2.0
3030 REM BY H.E. STRIEPE 198
     2
3040 REM
3100 REM INITIALIZATION
3110 REM
3115 DIM A$(10)
3120 BASTOP=PEEK(144)+256*PE
     EK(145)
```

```
3130 MEMTOP=PEEK(741)+256*PE
     EK(742)
3140 BUF=BASTOP+100
3150 BUFLEN=MEMTOP-BUF
3160 GT=7:PT=11:WT=ASC("W"):
     RD=ASC("R")
3200 ? CHR$(125);"INSERT BOO
     T SOURCE CASSETTE INTO"
     :? "CASSETTE DRIVE, PRE
     SS PLAY,":? "AND PRESS
     RETURN "
3205 REM TYPE 'PLAY' AND 'RE
     TURN' IN PREVIOUS LINE
     IN INVERSE VIDEO (ATARI
      LOGO KEY)
3210 OPEN #1,4,128,"C:":REM
     SHORT IRQ
3220 ? CHR$(125);"LOADING CA
     SSETTE BOOT FILE..."
3230 ERROR=USR(1700,1,GT,BUF
     ,BUFLEN)
3240 CLOSE #1:LINE=3200:GOSU
     B 4050
3250 IF ERROR=1 THEN ? CHR$(
     125);CHR$(253);"INSUFFI
     CIENT BUFFER SPACE...":
     FOR T=1 TO 250:NEXT T:R
     UN
3260 FILELEN=PEEK(203)+256*P
     EEK(204)
3270 REM
3280 REM THIS ROUTINE ASKS F
     OR
3290 REM INPUT ON WHETHER CA
     SSETTE OR
3300 REM DISK BOOT IS DESIRE
     D
3310 REM
3320 ? CHR$(125);"DO YOU WAN
     T A COPY ON CASSETTE":?
      "OR DISK (C/D)";:INPUT
      A$
3330 IF A$(1,1)="C" THEN 374
     0
3340 IF A$(1,1)="D" THEN 355
     0
3350 ? CHR$(253);"INCORRECT
     RESPONSE..."
3360 GOTO 3320
3500 REM
3510 REM THIS ROUTINE CREATE
     S A
3520 REM BOOT DISK
3530 REM
3550 ? CHR$(125);"INSERT A F
     ORMATTED DISK INTO"
3560 ? "DRIVE #1, PRESS RETU
     RN ":REM TYPE 'RETURN'
     IN INVERSE VIDEO
3570 DRIVE=1:STRTSECT=1:SECT
     CNT=INT(FILELEN/128)+1
3580 OPEN #2,4,0,"K:":GET #2
     ,A:A$=CHR$(A):CLOSE #2:
     ? A$
3590 ? CHR$(125);"WRITING BO
     OT DISK..."
3600 ERROR=USR(1600,DRIVE,WT
     ,STRTSECT,SECTCNT,BUF)
3610 LINE=3550:GOSUB 4050
3620 ? CHR$(125);"DO YOU WAN
     T ANOTHER"
3630 ? "COPY (Y/N)";:INPUT A
     $
3640 IF A$(1,1)="Y" THEN 332
     0
3650 RUN
3700 REM
3710 REM THIS ROUTINE CREATE
     S ANOTHER
3720 REM BOOT CASSETTE TAPE
3730 REM
3740 ? CHR$(125);"INSERT DES
     TINATION CASSETTE, PRES
     S":? "RECORD AND PLAY,
     AND PRESS RETURN ";
3745 REM TYPE 'RECORD', 'PLA
     Y', AND 'RETURN' IN PRE
     VIOUS LINE IN INVERSE V
     IDEO
3750 OPEN #1,8,128,"C:"
3760 ? CHR$(125);"WRITING BO
     OT FILE..."
3770 ERROR=USR(1700,1,PT,BUF
     ,FILELEN)
3780 CLOSE #1:LINE=3740:GOSU
     B 4050
3790 ? CHR$(125);"DO YOU WAN
     T ANOTHER COPY (Y/N)";:
     INPUT A$
3800 IF A$(1,1)="Y" THEN 332
     0
3810 RUN
4000 REM
4010 REM THIS SUBROUTINE EXA
     MINES THE
4020 REM ERROR VALUE RETURNE
     D FROM THE
4030 REM USR FUNCTION
4040 REM
4050 IF ERROR=1 OR ERROR=136
      THEN RETURN :REM NORMA
     L I/O EXIT OR END OF FI
     LE
4060 IF ERROR=0 THEN 4090
4070 ? CHR$(125);CHR$(253);"
     I/O ERROR, CHECK PERIPH
     ERALS":? "AND TRY AGAIN
     ..."
4080 FOR T=1 TO 300:NEXT T:P
     OP :GOTO LINE
4090 GRAPHICS 0:POSITION 2,1
     4:? CHR$(253);">>>> PRO
     GRAM ERROR,  REVIEW USR
      <<<<             ARGU
     MENTS...":STOP
```

TYPO TABLE

Variable checksum = 533080

Line num range	Code	Length
3000 - 3150	VS	228
3160 - 3260	BX	532
3270 - 3510	WR	330
3520 - 3640	VU	445
3650 - 3790	OE	440
3800 - 4090	CK	450

BASIC COMMANDER

MMG Micro Software
P.O. Box 131
Marlboro, NJ 07746
(201) 431-3472
$34.95
16K — Diskette
Reviewed by Roy D. Wolford

Serious Atari BASIC programmers will love this powerful programming tool. **BASIC Commander** combines many programming aids that are generally found only as separate programs. This diskette provides the following features: an automatic line-numbering generator, a renumbering program, a block delete program, seven programmed keys, three programmable keys, six DOS function keys and a "help" file. The only catch is that this program uses 7.4K of memory, a small price to pay for the benefits derived.

To load the program, turn on your disk drive, insert the diskette, plug in the BASIC cartridge, and turn on the computer. BASIC Commander will load in about 22 seconds. Remove BASIC Commander, insert your program diskette, and you are ready to go.

The automatic line-number generator assigns and enters line numbers for you at increments you choose, within the range of 1 to 32767. The default values are 10 (starting line numbers) and 10 (increment). After choosing your values, press [RETURN] and the first line number is displayed with the cursor positioned one space to the right, ready for you to type.

New line numbers can even be entered in the middle of an existing program. The only danger is if the new starting line number is the same as an existing line number. If this happens, the existing line number will be erased. However, when BASIC Commander detects this, two beeps will sound and the autonumbering mode is exited. This prevents accidental erasing of an existing line number.

The renumbering programs is just as simple to call. Press [SELECT] and you will be prompted to enter "INCREMENT AND START" values. Again, the default values are 10,10. Once the line number values are entered, press [RETURN], and it's done; 500 lines are renumbered in 3 seconds. Your program is renumbered, including all line reference statements like GOTO and GOSUB. Any indirect line references like GOTO A or GOSUB 4*A are not renumbered, but the line numbers on which they occur are listed on the screen so that you can easily edit them.

The block delete program is called by pressing [OPTION]. You will be prompted to enter "START AND END" values. After entering the values, press [RETURN] and all the line numbers within and including the starting and ending values are deleted. Both the renumbering and block delete modes can be exited by pressing the [BREAK] key.

As mentioned earlier, there are seven programmed keys. These keys, in conjunction with the CTRL-key, perform frequently used functions. The functions are Save, Enter, List, ?#6, Load, Run and a listing of all variables you have used in your BASIC program. The respective keys used are S, E, O, P, L, G, and V. To enter the desired command, in either immediate (no line number) or deferred (with line number) mode, simply press the CTRL-key and the desired programmed key simultaneously, enter your filename, then press [RETURN]. The command will be entered as if you typed the entire line.

The next set of keys consists of three that are programmable by the user. First press the CTRL-key and Q key together. The prompt "SELECT KEY (A,B OR C)" will be displayed. Choose any one of the keys and press [RETURN]. You will then be requested to enter any command or statement desired, to a maximum of 36 characters. For longer statements (maximum of 108 characters), the three keys can be strung together.

The last set of keys is used to call six DOS functions without leaving the BASIC program, using the same procedure as is used with the other programmed keys. The six functions are Directory, Lock, Unlock, Delete, Rename, and Format. The respective keys used are D, K, U, X, R and F. All functions work as if DOS DUP.SYS was being used. This is needed, because BASIC Commander will be erased from memory if DOS is ever accessed.

In case you want to use the graphics character instead of the programmed function of a key, you can toggle back and forth from the programmed mode to nonprogrammed mode by pressing CTRL-0 (zero).

If you ever need help, type RUN"D:HELP" and press [RETURN]. MMG Micro Software provides excellent documentation, and a small self-adhering label with all options printed on it. BASIC Commander is covered by warranty and enhancements will be made available.

WAYOUT

Sirius Software
10364 Rockingham Blvd.
Sacramento, CA 95827
(916) 366-1195
$39.95 48K — Diskette

Reviewed by David Duberman

Video games now rank as one of the most popular forms of entertainment,

continued on next page

and for several reasons. Most people would agree that their ability to remove you from reality is not the least common of them. A game's success in the marketplace can often be determined by how well it helps you to escape from this world and transport you into another reality.

Wayout is such a game and it puts you into another world better than any other video game I have seen. Published by Sirius Software, the setting for this other reality is a series of mazes. At the game's outset you can choose from any of 26 different mazes with names like Towers, Flowers and Worms. You travel through the chosen maze at eye-level (the walls are right in front of you) and you can see your progress in an inner square centered on the screen. Above the square are two compasses that indicate your forward motion and below that is a map that shows where you are within the maze.

The graphics that appear before you as you move through the maze are more life-like and dramatic than I have ever seen. What I really want to say is — WOW! The 3-D animation and the quick response of the display to your joystick movements make this game the last word in alternate-reality simulation. Lots of games try to accomplish this, but Sirius has created one here that surpasses others in reaching that goal. I found that it took me about ten minutes to get a feel for moving about in the maze.

In each maze, the object is to find the exit — the way out. Each maze is extremely long and convoluted, so this is no easy task. Your progress is constantly hampered by a mischievous creature known as the Cleptangle. It is a playful but annoying entity that lurks about trying to steal your compass and mapmaker. If it catches up with you and takes either or both, you may still move about the maze, but your direction is no longer guided. You can detect the Cleptangle's presence when you hear a low, rippling tone and if you act fast you can evade it or track it down. Usually you will just want to avoid it, but if it has already stolen your map or compass you will want to get them back.

Wayout has two features that allow you to save the game for later. In the first you may transfer the game to disk at any point. You may also press [SHIFT] and any number key from 1 to 6 to save your progress at any given point.

This game is one that many software designers have dreamed of writing, so kudos to Paul Edelstein for this state-of-the-art achievement. Wayout is an instant classic, and a game that no ATARI owner should be without. Even if you don't play it (unthinkable!), it makes a stunning graphics demo.

"TRICKY TUTORIALS"

Educational Software
4565 Cherryvale Ave.
Soquel, CA 95073
(408) 476-4901
$19.95–$29.95
16K Cassette
24K Diskette

Reviewed by David and Sandy Small

Maybe you have just bought your ATARI, or perhaps you've had it for a while, but something strange happens to you on your way to becoming a 9th Class Star Raiders Super Commander. Suddenly you realize that you actually want to learn what makes this machine tick.

So, you settle down to learn about the ATARI. The BASIC Reference Manual is, we agree, hopeless; the Assembler/Editor Manual, ditto. How about *De Re Atari*? It's a great book, but a little technical; and the OS/Hardware manuals, are completely incomprehensible.

You will be tempted to throw up your hands and go back to playing Shamus. I should know; I dedicated more than a year to finding out about this machine, and it was good to find someone who could really help. His name is Robin Sherer, founder and president of Educational Software, formerly Santa Cruz Educational Software.

Robin wrote a series of programs, the **Tricky Tutorials**, complete with a number of short demonstrations and examples, on various subjects. At last count, they were:

1. Display Lists.
2. Horizontal/Vertical Scrolling.
3. Page Flipping.
4. Basics of Animation.
5. Player/Missile Graphics.
6. Sound and Music.
7. Disk Drive Utilities.
8. Character Graphics.

If you're a computer snob, you're going to hate this stuff. It is written in an easygoing, plain fun style, definitely not dry and boring! Robin is a friendly person, and he wants to teach, not feed his ego. Still, he knows what he's talking about. He doesn't try to convert you to hexadecimal or assembly language; he shows you what the machine is about in BASIC (no small feat).

Robin's code is not perfect, by any means, and there are a few flaws in the booklets too. But overall the Tutorials are accurate and provide much-needed practice using the ATARI's special capabilities.

Looking at someone else's code is one of the best ways to improve a programmer. Robin's code is all open — not copy-protected — go-ahead-and-play-with-it good stuff. He stays with the novice, and tries to pass on

valuable techniques. If you need some examples of locating a P / M bitmap on a page boundary, Robin's code will show you the ins and outs.

Some of the Tutorials were written by Jerry White, who has written an amazing amount of stuff for the ATARI. Adding Jerry to his group of programmer / writers gives Robin even more capabilities and promises more tutorials for the future.

The Tutorials come in an attractively-packaged illustrated booklet, with easily readable text. The sample programs come on either disk or tape, and may be loaded and run directly.

If you're used to paying $39.95 for games, then $19.95 each for Tutorials 1, 2, 3, 4 and 6 will please you. The others are $29.95. They are all very much worth it, and if you're not happy, you'll get a refund. All six Tutorials, purchased together, come in a very nice binder for the price of $99.95. This package will provide quite a bit of help for you.

Not to be overlooked is Educational Software's **Master Memory Map**. This is a handy list of just about every ATARI memory location you ever wanted. I have this map pinned up on the wall as a quick reference guide. It is very helpful, and a steal at $6.95.

One other point about the quality of these products; this company has been in business for some time. As other software houses have learned, if you don't turn out a quality product, you don't get repeat customers. (Remember Crystalware?) Robin has plenty of repeats, and I've never heard a complaint about his products — just good comments.

The Tricky Tutorials are good products, fun to learn with, and valuable aids in learning about the ATARI. I'd recommend them to anyone making the first big steps into learning about the machine. Atari, Inc. certainly thinks so; it's one of Robin's biggest customers.

DISKEY

Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 372-7172, orders only
(305) 863-6917, business
$49.95, 32K — Diskette

Reviewed by Dave Mentley

Diskey is a comprehensive collection of routines neatly tied together to allow you to unlock your drive for diagnostic, recovery or whatever reasons you may have. Many of the functions are available on other disk utility packages or through users' groups libraries of public domain software, but a few of the key routines are unique to Diskey (Erase Disk without reformatting and Special File Copy without any directory entry, for example.) Diskey is written in BASIC with many Assembly routines which give it an edge over other utilities as far as speed goes.

My philosophy on packaged software is that if the program is not designed so that the documentation is intuitively obvious, then the program is not for me. In other words, like most of you, I don't read instructions. If you do not read the excellent booklet (61 pages) supplied with Diskey not only will you be missing out on a lot of valuable information, but you won't be able to do anything at all with this program.

What can you do with Diskey? Generally, you will be able to read any readable sector on a disk, modify sectors to your specifications, modify directory entries and trace and repair files. Files with major damage (which happens when you lay your floppy disk on your 100 watt speaker magnet or drop a gob of cream cheese on the media surface) cannot be repaired. Minor dmage (such as a scratch or laser hole which only damages one or two sectors) can be readily repaired with practice. Old, inexpensive disks may lose integrity as the magnetic domains relax and become difficult to read (this may take years). Diskey can be used to read and reread the weak sectors until an intact replica is made and the file and be reconstructed on another good disk. My directories tend to get scrambled after many deletions and saves to the same disk. Diskey can be used to patch the directory enough to safely move your good files to a new disk.

The tools available in Diskey (I counted 57) can be grouped into 8 types: Read routines, Zap (modify and write), Informational, Search, Error Discovery, Copy, Repair and Support. While there are too many to relate here, I will try to cover a few of the more remarkable tools.

Briefly, you can: build a disk map with detailed diagnostics (empty sectors along with discontinuous, bad, ending, etc.), search for a string of up to 20 bytes on the disk, find the code that will load into a specific memory address in a binary load file, rebuild the VTOC, check for RPM of drive, trace a file and follow linking and referrals from directory, copy a file with a dead directory using only the file number, select an Exclusive OR sector map print mask (got that?) and dump the screen to printer at any time. Hitting the "X" key will abort most routines while in progress and "P" will dump to the printer.

There really is nothing you could add to Diskey to improve it. (That's what they said about the 4K RAM chip, too.) It is written for the near beginner and will make you into an intermediate user with steady application.

BASIC ROUTINES

Adventure International
P.O. Box 3435
Longwood, FL 32750
(305) 862-6917
$24.95
24K Diskette, 16K Cassette

Reviewed by David Plotkin

BASIC Routines for the ATARI, from Adventure International, is a collection of utility programs in Atari BASIC written by the prolific Jerry White. Many of the routines have been published before, some are even in user-group libraries. Nevertheless, the combination of informative booklet and disk (or cassette) make for a well-rounded package.

BASIC Routines is not meant to be a tutorial. While it is possible to learn a great deal from studying the listings and from the clear, concise explanations, some knowledge of BASIC is assumed. This software is aimed at the intermediate user — the bulk of us who aren't really beginners, but haven't reached the Assembly Language level yet. However, it is possible to use most of these routines even without understanding how they work. If you need a string sort, for example, you can use the one provided.

The routines range from simple to complex. You start with such things as turning off sound, reading the joysticks and paddles, material really suitable for beginners. You quickly progress to a masterful Player-Missile Graphics demo packed with useful information (including some Assembly subroutines for animating shapes). The package finishes up with some very useful utilities, tips on program speed and conserving memory, and a list of useful memory locations and how to use them. The utilities include such general-purpose tools as disk utilities (formatting, unlocking a file, etc.), Binary to Decimal conversion, and Basic Line Delete.

The manual encourages the user to experiment with the programs, and the documentation is more than adequate for that, explaining what each section of code does. Jerry uses the "named GOSUB" capability of the ATARI to good advantage. You can GOSUB DING where DING was defined earlier in the program. One minor problem with the documentation is the quality of the printing — the listings are hard to read. Of course, you can call up the particular program and read the listing from the computer, but it would be helpful if the print quality were better.

BASIC Routines gets especially high marks for PMDEMO and MODE123 (the custom display list). Both of these programs are fairly long and very useful. MODE123 includes enough background on display lists so that, with some experimentation, you should be able to customize your own displays. The greater-than-average amount of documentation is appropriate, since modifying display lists is one of the more difficult aspects of programming the ATARI.

Finally, the Sound demo includes a large number of sounds which can be included in your own program, and there is information on how to generate those ultra-low base notes.

Overall, BASIC Routines for the ATARI is a good value. The combination of good documentation, printed listings and useful utilities are a worthwhile investment. Jerry White encourages you to experiment and dig into the listings. Take it from a guy who did it exactly this way, you will be constantly learning new things and your efforts will be richly rewarded.

JEEPERS CREEPERS

Quality Software
6660 Reseda Blvd., Suite 105
Reseda, CA
$29.95 — 32K Diskette

Reviewed by Marty O'Donnell

Jeepers Creepers is the most original variation on the video maze game that I have yet seen. The mazes in Jeepers Creepers are actually interconnected pathways that divide the playfield into many rectangles, as streets separate city blocks.

When the game begins, all the pathways in the maze are orange. As your player, the bug, moves along, it changes the color of the pathway to yellow. When all four sides of a rectangle are colored yellow, the players freeze momentarily while the interior of the rectangle turns blue. You are awarded points for each blue rectangle you make, according to the size of the rectangle.

As you move around the maze, three wasps will appear and try to sting you. If stung, you will lose one of your five lives. Some of the rectangles in each maze contain the image of a beetle. When you complete the pathway around one of these rectangles, a beetle will appear to seek out and eat one of the wasps. Each maze has randomly-placed super beetles which can speed up briefly and eat many wasps (shades of PAC-MAN).

There are also rectangles labeled "jump" which allow you to escape wasps by jumping instantaneously to a random point elsewhere in the maze. You are awarded one jump for each of these rectangles you complete, and jumps can be used at any time during the game by pressing the joystick button.

The playfield is done in one of the ATARI's medium resolution graphics modes (Antic modes 13 / OS mode 7). Below the maze, a text display indicates the current score, high score, jumps remaining, lives remaining and "coast" mode. If you choose to coast, the bug will move in the direction the joystick was last pointed. If the coast mode is off, the bug stops when the joystick is in the neutral position.

My complaints about Jeepers are minor. I would like multi-colored players and a save-high-score feature.

Jeepers Creepers lives up to its publisher's name — it is quality software and I recommend it, especially to arcaders and maze-game fans.

MINER 2049er

Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
(213) 782-6861
$49.95
16K — Cartridge

Reviewed by Deborah Burns

"Bounty Bob" in **Miner 2049er** looks like a typical 1849 gold-rush prospector, but his obstacles in this game are much more futuristic. Deadly mutant organisms and radioactive waste plague his progress through the mine shafts instead of angry Indians or claim jumpers. Like the popular arcade game Donkey Kong, the object of this game is for the player to travel to the top of a ladder (in this case, mine shaft) and score points along the way.

The colorful screen displays ten different zones in which the scene of the mine shaft changes. Each new zone is increasingly difficult. In Zone 2, the slides cause you to slip just as you are proceeding up the shaft. In Zones 4 and 5, you must jump from one lillipad to another, but if you land somewhere in between you are wiped out.

continued on page 90

continued from page 87

In Zone 9, the obstances are much more complex, and if you fall you are destroyed by the pulverizers.

In every zone you must avoid contact with the mutants that guard each station within the mine shaft. These mutants are usually fatal, but they can be rendered harmless. As you climb the shaft and score points by gathering tools along the way, the mutants turn green and edible and are no longer dangerous.

Miner 2049er is a challenging and complicated game, and much more difficult than it first appears. The manual clearly explains all the levels and objects of the game and how the various strategies can be executed. You may freeze your play momentarily or begin a new game at any time. A cannon may be fired by pressing the spacebar and in some zones you may "beam up" to another level.

Miner 2049er begins with a demonstration screen where "Bounty Bob" appears, accompanied by the popular gold-rush tune "Clementine". This game transports the '49er from the Wild West of the 1800's to the 21st century world of mutants and lasers.

HOME FILING MANAGER

Atari Inc.
P.O. Box 427
Sunnyvale, CA 94086
$49.95
16K Diskette

Reviewed by Chris Chabris

The **Home Filing Manager** is a new program from Atari that performs all of the standard database functions in a much more approachable manner than most of the complex systems on the market today. Each screen shows a picture of an ordinary index card with one red and seventeen blue lines. You simply type the card exactly as you want it to look. Inverse video and graphics characters may not be used, but full screen-editing capabilities are available.

When booted, this pure machine-language program displays a well-drawn picture of a file box under the title block, and prompts the user to insert a data diskette. Each diskette contains one file of 115 to 700 cards. After booting, the program diskette is no longer needed during the session.

Three menus are used:

1. **Diskette Menu** — used to prepare (format) or switch data diskettes. Each data diskette is allowed a name of up to 18 uppercase characters.
2. **Main Menu** — lists the major options available, such as flipping through cards, searching, and quitting.
3. **Display Menu** — a line of choices shown above the card display, showing commands related to printing, editing, erasing, and writing cards.

Selection of menu optons is simple: press [SELECT] until the desired option is highlighted in inverse video. Then press [START] to begin that selection. Audio cues enhance the selection process.

Searching capabilities are not as comprehensive as those of larger systems, but I have found them adequate for all of my needs. One may "fetch" a card according to its title (defined as anything typed on the card's red line); or search the entire data diskette for all cards containing a specific phrase anywhere on the card, including in the title.

The documentation, provided in a 28-page booklet liberally sprinkled with realistic screen diagrams, includes a tutorial as well as a flowchart of program operation. After studying it for about twenty minutes, I had virtually no more questions about the program's use. No reference card is included, as the program is so easy to learn.

In summary, it must be stated that large database systems will have more functions and greater capacities, and probably will be less user-friendly than The Home Filing Manager. However, this program lives up to its name. It is truly a "home" filing manager.

The **Home Filing Manager** will be offered soon as part of the new **Home Manager Kit**, which will include the Personal Financial Management System program.

BAJA BUGGIES

Gamestar
1302 State St.
Santa Barbara, CA 93101
(805) 963-3487
$31.95
16K Diskette and Cassette

Reviewed by Marc R. Benioff

Baja California is a 1000-mile-long Mexican peninsula that has been for some years the site of grueling desert races for off-road vehicles called Baja buggies. Usually these buggies are beefed-up, stripped-down old Volkswagens. Now there is a new computer game from Gamestar named **Baja Buggies** that lets you pretend you are driving in this race.

Since you are the novice driver, you start *last* — in a field of 80 other cars. Your goal is to finish first, and that means you have to pass all the competition. You steer with the joystick and can brake by pushing the fire button.

When the race begins your car automatically spurts ahead at full speed and you pass a few other cars. The buggy bounds through a 3-D landscape of realistic and dangerous scenery. The track is narrow and collisions with other cars can only be avoided by using extreme care.

Your position improves as the game progresses — 50th, 49th, 48th. Maybe you *can* catch up with the first three cars. A small "radar" display at the bottom of the screen shows your relative position.

The game ends when the first car crosses the finish line. I have managed to place tenth in the race, but Gamestar claims it is possible to make it to second or third.

Baja Buggies is an excellent product. Compared to driving games of the past, this is a programming masterpiece. It has some similarities to "Turbo" by Sega, but it is not just a copy. It was created by Scott and Keith Orr, formerly of Arcade Plus, whose Ghost Hunter was a popular PAC-MAN lookalike. The Orrs left Arcade last June, and started Gamestar in October. This is their first product.

TAX DODGE

Freefall Associates
Box V
Bethel Island, CA 94511
(415) 684-2664
$39.95
32K Diskette

Reviewed by Davey Saba

Tax Dodge is a clever computer game that looks and feels much like PAC-MAN. The main features of the game are the scrolling maze, through which a player figure travels in search of money and fringe benefits, and five tax agents that are constantly after your player.

The game revolves around your ability to collect cash and avoid being touched by the tax agents. Much like the board game Monopoly, you may achieve your goal by passing over certain sections and gaining certain credits. For example, if you go past the space that says "accountant," you get a tax shelter. You may gain or lose advantages however, some of which are deductions, court dates, tax havens, etc.

ERRATA

In the program "Spider", which was printed in ANTIC #3, the string ERASE$ should be filled with ten "hearts" (CONTROL-COMMA characters) in line 170. This allows the trail of the spider to be erased as it moves vertically.

We have been receiving a great deal of correspondence lately. If you would like a personal response, please enclose a stamped self-addressed envelope.

Tax Dodge comes with a small pamphlet which adequately describes the game and gives directions. The game is difficult to master and sometimes gets frustrating, much like filling out your tax form on April 14th! One problem with the game is that the player figure is more difficult to control compared to other arcade-type games. On the plus side, it does have a freeze action feature (press the space bar).

While most players will probably enjoy Tax Dodge, accountants and lawyers with computers would really go for it. Tax Dodge is an interesting and amusing game with some new twists. The game should have good staying power, and it is at least one legal way to beat the IRS.

The game is very realistic. As in real life, the more cash you earn, the more harrassment you get from the tax agents. In fact, there is even an IRS office in the center of the maze. Other features are the surprise audits and the mysteriously vanishing tax decutions.

Progress is judged by the amount of earnings you acquire in a year. A scoreboard at the bottom of the screen keeps track of the account and to advance to higher income levels you must produce more and more cash. The game also has a time-keeping feature, and if you are not finished by April 15th and back at home base, you are busted and the game ends.

continued on next page

MENUMAKR

Computer's Voice
2370 Ella Dr.
Flint, MI 48504
(313) 238-5585
$24.95
16K — Diskette
8K — Cassette

Reviewed by David Duberman

Menumakr is a program that writes programs. It can be used to create menus for programs you are writing, or to write characters, screen by screen. This saves you the work of determining plot points and specifying their contents.

Suppose you lay out a screen of instructions for a program you are writing. Menumakr will scan your screen, identify the characters involved and their locations, and write the BASIC statements to recreate it in your program. Creating attractive screens will make your products more professional.

The file created by Menumakr can be saved to either cassette or diskette. The file will be BASIC statements that can be used to begin a program (a title or instruction menu, for example), or merged with an existing program. The screens are saved in List form.

The BASIC statements that print information all begin with a POSITION statement that you can manipulate by editing, if necessary. A "clear screen" character is automatically inserted at the beginning of each new screen of characters, and a routine checks for [RETURN] at the end of each screen. These features can be used or altered as you see fit.

Documentation with the product offers some ideas for still other uses. It could read and print "status" screens showing information updated from the last reading, or create multiple, independently-updated graphics displays for game programming.

Menumakr is limited to BASIC Graphics Mode 0, but seems to be a helpful and interesting utility none the less.

continued from page 52

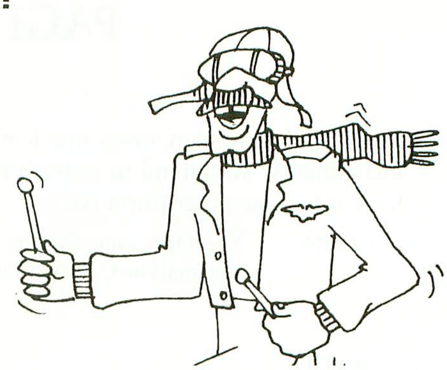
```
100 R: ***** PILOT SOUNDER *****
110 R:
120 R: ANTIC VOL 1, NO. 6
130 R: K. W. HARMS
140 R:
150 *MAINLINE
160 R:
170 U:*STARTUP
180 R:
190 *SENSE
200 R:
210 J(%JO=0)+(%JO=5)+(%JO=6)+(%JO=10):
*SENSE
220 R:JUMP TO SENSE IF JOYSTICK IDLE
230 R: OR ON DIAGONAL
240 C:#T=%T8 [SENSE TRIGGER ON JOYSTIC
K
250 C:#J=%JO [SENSE JOYSTICK POSITION
260 U(#T):*CURSORMOVE [TRIG PRESSED
270 U(#T=0):*VALUECHANGE [NO PRESS
280 J:*SENSE [WORK DONE, SENSE AGAIN
290 R:
300 *CURSORMOVE
310 R:
320 POS:(#C*10)-5,#R+1
330 T:             [10 BLANKS
340 C(#J=4):#C=#C-1 [MOVE LEFT
350 C(#J=8):#C=#C+1 [MOVE RIGHT
360 C(#J=1):#R=#R-5 [MOVE UP
370 C(#J=2):#R=#R+5 [MOVE DOWN
380 R:CALCULATE WRAPAROUNDS
390 R:ONLY COLUMNS 2 & 3 ARE OK
400 R:ONLY ROWS 5,10,15 & 20 ARE OK
410 C(#C=1):#C=3 [TOO LEFT, GO RIGHT
420 C(#C=4):#C=2 [TOO RIGHT, GO LEFT
430 C(#R<5):#R=20[TOO FAR UP, GO DOWN
440 C(#R>20):#R=5[TOO FAR DOWN, GO UP
450 R:PRINT CURSOR IN NEW POSITION
460 POS:(#C*10)-5,#R+1
470 T:^^^^^^ [6 REVERSE SHIFT *S
480 PA:15 [SLOW DOWN FOR HUMANS
490 E:
500 R:
510 *VALUECHANGE
520 A:=#R[PUT ROW # INTO ACCEPT REG.
530 M:5,10,15,20
540 JM(#C=2):*FVOICE0,*FVOICE1,*FVOICE
2,*FVOICE3
550 R:LINE ABOVE JUMPS ON VALUES
560 R:OF ROWS IN THE ACCEPT REGISTER
570 JM(#C=3):*CVOICE0,*CVOICE1,*CVOICE
2,*CVOICE3
580 R:SAME FOR CONTROL VALUES
590 E:
600 R:
610 *FVOICE0
620 C(#J=1):#Q=#Q-1 [LOWER VALUE
630 C(#J=2):#Q=#Q+1 [HIGHER VALUE
640 C(#Q>255):#Q=0  [WRAPAROUND
650 C(#Q<0):#Q=255  [DITTO
660 POS:(#C*10)-5,#R
670 T:   #Q  [REM IS SPACE HOLDER
680 C:@B53760=#Q [VALUE INTO REG
690 E:
700 R:
710 *FVOICE1
720 C(#J=1):#S=#S-1 [#R & #T WERE
730 C(#J=2):#S=#S+1 [ALREADY USED
740 C(#S>255):#S=0  [WRAPAROUND
750 C(#S<0):#S=255  [DITTO
760 POS:(#C*10)-5,#R
770 T:   #S  [REM IS SPACE HOLDER
780 C:@B53762=#S [VALUE INTO REG
790 E:
800 R:
810 *FVOICE2
820 C(#J=1):#U=#U-1 [LOWER VALUE
830 C(#J=2):#U=#U+1 [HIGHER VALUE
840 C(#U>255):#U=0  [WRAPAROUND
850 C(#U<0):#U=255  [DITTO
860 POS:(#C*10)-5,#R
870 T:   #U  [REM IS SPACE HOLDER
880 C:@B53764=#U [VALUE INTO REG
890 E:
900 R:
910 *FVOICE3
920 C(#J=1):#V=#V-1 [LOWER VALUE
930 C(#J=2):#V=#V+1 [HIGHER VALUE
940 C(#V>255):#V=0  [WRAPAROUND
950 C(#V<0):#V=255  [DITTO
960 POS:(#C*10)-5,#R
970 T:   #V  [REM IS SPACE HOLDER
980 C:@B53766=#V [VALUE INTO REG
990 E:
1000 R:
1010 *CVOICE0
1020 C:#D=(#W/32) [BASIC'S DISTORTION
1030 C:#L=#W\32 [MODULO IS LOUDNESS
1040 U:*FACTOR
1050 C:#W=#D+#L
1060 POS:(#C*10)-5,#R
1070 T:#D+#L=#W         [SPACE HOLDER
1080 C:@B53761=#W [INTO CNTRL REG
1090 E:
1100 R:
1110 *CVOICE1
1120 C:#D=(#X/32) [BASIC'S DISTORTION
1130 C:#L=#X\32 [MODULO IS LOUDNESS
1140 U:*FACTOR
1150 C:#X=#D+#L
1160 POS:(#C*10)-5,#R
1170 T:#D+#L=#X         [SPACE HOLDER
1180 C:@B53763=#X [INTO CNTRL REG
1190 E:
1200 R:
1210 *CVOICE2
1220 C:#D=(#Y/32) [BASIC'S DISTORTION
1230 C:#L=#Y\32 [MODULO IS LOUDNESS
1240 U:*FACTOR
1250 C:#Y=#D+#L
1260 POS:(#C*10)-5,#R
1270 T:#D+#L=#Y         [SPACE HOLDER
1280 C:@B53765=#Y [INTO CNTRL REG
1290 E:
1300 R:
1310 *CVOICE3
```

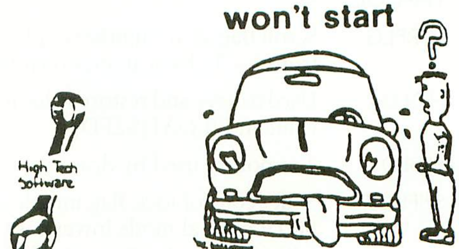
continued on next page

```
1320 C:#D=(#Z/32) [BASIC'S DISTORTION
1330 C:#L=#Z\32 [MODULO IS LOUDNESS
1340 U:*FACTOR
1350 C:#Z=#D+#L
1360 POS:(#C*10)-5,#R
1370 T:#D+#L=#Z          [SPACE HOLDER
1380 C:@B53767=#Z [INTO CNTRL REG
1390 E:
1400 R:
1410 *FACTOR
1420 C(#J=1):#L=#L-1 [LOWER VALUE
1430 C(#J=2):#L=#L+1 [HIGHER VALUE
1440 C(#L>15):#D=#D+1 [15 IS HIGHEST
1450 C(#L>15):#L=0 [LOUDNESS LEVEL
1460 C(#L<0):#D=#D-1 [0 IS LOWEST
1470 C(#L<0):#L=15   [WRAPAROUND
1480 C(#D>7):#D=0 [LEVEL 7 IS HIGHEST
1490 C(#D<0):#D=7 [LEVEL 0 IS LOWEST
1500 C:#D=#D*32
1510 E:
1520 R:
1530 *STARTUP
1540 GR:QUIT [CLEAR SCREEN
1550 C:@B752=1 [TURN OFF CURSOR
1560 POS:2,3
1570 T:    VOICES    PITCH # CONTROL #
1580 POS:2,4
1590 T:    VOICE 0     53670     53761
1600 POS:2,9
1610 T:    VOICE 1     53672     53763
1620 POS:2,14
1630 T:    VOICE 2     53674     53765
1640 POS:2,19
1650 T:    VOICE 3     53676     53767
1660 C:#R=5   [SET UP ROW FOR START
1670 C:#C=2   [SET UP COLUMN FOR START
1680 POS:(#C*10)-5,#R+1 [START POS
1690 T:^^^^^^ [6 REVERSE SHIFT *S
1700 E:
```

```
10 R: SPECIAL EFFECTS
20 R: ANTIC VOL 1, NO.6
30 R:
40 U:*REGISTERS
100 U:*BOUNCINGBALL
110 U:*JACKHAMMER
120 U:*LIGHTNING
490 E:
500 R:
510 *BOUNCINGBALL
520 C:#Z=6[NUMBER OF BOUNCES
530 *BALL1
540 C:#Y=22*2
550 *BALL2
560 POS:18,(#Y/2)+1
570 T: [SPACE HOLDER
580 POS:18,(#Y/2)
590 T:'  [CTRL
600 C:@B#A=(#Y*10)/2
610 C:@B#B=224+((#Y/4)-5)
620 C:#Y=#Y-1
630 J(#Y>10):*BALL2
640 PA:15
650 *BALL3
660 POS:18,(#Y/2)-1
670 T: [SPACE HOLDER
680 POS:18,(#Y/2)
690 T:'  [CTRL .
700 C:@B#A=(#Y*10)/2
710 C:@B#B=224+((#Y/4)-5)
720 C:#Y=#Y+1
730 J(#Y<(22*2)):*BALL3
740 C:#Z=#Z-1
750 C:@B#A=0
760 C:@B#B=0
770 J(#Z>0):*BALL1
780 E:
1000 R:
1010 *JACKHAMMER
1020 GR:QUIT
1030 C:@B752=1[TURN OFF CURSOR
1040 C:#Z=0
1050 U:*PICTURE
1060 *JACKHAMMER1
1070 C:@B#A=103
1080 C:@B#B=96+14
1090 POS:16,17
1100 T: [CTRL S
1110 PA:@B20
1120 SO:0
1130 POS:16,17
1140 T: [TYPE A SPACE
1150 PA:@B20/7
1160 C:#Z=#Z+1
1170 E(#Z=15):
1180 J:*JACKHAMMER1
1190 *PICTURE
1200 C:@B84=8 [SETS ROW
1210 C:@B82=14[SETS MARGIN
1220 T:      [BLANK TO MOVE TO MARGIN
1230 T:   [6 CTRL N
1240 T:     [CTRL V,BLANK,CTRL B
1250 T:     [SAME AS 1180
1260 T:     [SAME AS 1180
1270 T:     [SAME AS 1180
1280 T:     [CTRL G,BLANK,CTRL F
1290 T:    [CTRL B, CTRL V
1300 T:       [3 BLANK, REVERSE BLANK
1310 T:      [3 BLANK, CTRL S
1320 C:@B82=2 [RESETS MARGIN
1330 POS:2,18
1340 T:
1350 R:LINE ABOVE IS 76 REVERSE SPACES
1360 E:
1500 R:
1510 *LIGHTNING
1520 C:#X=-70
1530 GR:CLEAR [HERE TO TURN ON SCREEN
1540 T:
1550 T:NEVER TWICE IN THE SAME PLACE,
EH?
1560 R:
1570 *LIGHT1
1580 U:*STRIKE
1590 U:*SOUND
1600 C:#X=#X+14
1610 PA:60
1620 J(#X<75):*LIGHT1
```

```
1630 PA:300
1640 GR:QUIT [BACK TO TEXT
1650 E:
1660 R:
1670 *STRIKE
1680 C(#S=3):#S=0
1690 C:#S=#S+1
1700 GR(#S=1):PEN YELLOW
1710 GR(#S=2):PEN RED
1720 GR(#S=3):PEN BLUE
1730 GR:GOTO -#X,47
1740 GR:DRAWTO 0,-31
1750 E:
1760 R:
1770 R:
1780 *SOUND
1790 C:#P=0
1800 *SOUND1
1810 C:@B#A=#P
1820 C:@B#B=0+(14-(#P/20))
1830 C:@B#C=#P
1840 C:@B#D=128+(14-(#P/20))
1850 C:#P=#P+5
1860 J(#P<240):*SOUND1
1870 PA:3
1880 SO:0
1890 PA:60
1900 E:
9800 R:
9810 *REGISTERS
9820 C:#A=53760[PITCH VOICE 0
9830 C:#B=53761[CNTRL VOICE 0
9840 C:#C=53762[PITCH VOICE 1
9850 C:#D=53763[CNTRL VOICE 1
9860 C:#E=53764[PITCH VOICE 2
9870 C:#F=53765[CNTRL VOICE 2
9880 C:#G=53766[PITCH VOICE 3
9890 C:#H=53767[CNTRL VOICE 3
9900 E:
```





by JAMES CAPPARELL

Memory Map

PAGE 2 CONTINUED

Memory Map is an on-going feature of ANTIC. See issues #1, 2 and 3 for previous installments. We intend to publish the function of all the low memory RAM locations. The format for our description is:

Example:

12	$C	2	DOSINI	The Operating System variable called DOSINI uses 2 contiguous locations starting at address 12 (decimal) or C (hexidecimal).

673	$2A1	1	TMPLBT	??
674	$2A2	1	ESCFLG	Used by screen editor. Flag set to $80 when ESC[$1B] character detected. Reset to 0 following output of next character. Causes character following ESC to be displayed only exception is EOL [$9B].
675	$2A3	15	TABMAP	Logical line start.
690	$2B2	4	LOGMAP	Logical line bitmap. When a bit is set then a logical line starts at the corresponding physical row number. All bits set to 1 when text screen is opened or cleared.
694	$2B6	1	INVFLG	Inverse video flag toggled by ATARI logo key sets bit 7 = 1
695	$2B7	1	FILFLG	Indicates to display handler whether current operation is fill <> 0 or draw = 0
696	$2B8	1	TMPROW	??
697	$2B9	2	TMPCOL	??
699	$2BB	1	SCRFLG	Scroll flag set to number of physical lines-1 that were deleted from top of screen. Since logical lines range from 1 - 3 physical lines then this variable ranges from 0 - 2
700	$2BC	1	HOLD4	Used to save and restore value in ATACHR[$2FB] during fill process when ATACHR is temporarily set to value in FILDAT[$2FD]
701	$2BD	1	HOLD5	Temporary used by draw
702	$2BE	1	SHFLOK	Shift/control lock flag initialized to $40 at powerup $00 = normal mode lower case alpha $61-$7A $40 = caps lock upper case $41-$5A $80 = control lock $01-$1A
703	$2BF	1	BOTSCR	Bottom of screen = 4 then mixed mode, = 24 then normal
704	$2C0	4	PCOLR0 - PCOLR3	Player color registers and shadows
			PCOLR0	= COLPM0[$D012]
			PCOLR1	= COLPM1[$D013]
			PCOLR2	= COLPM2[$D014]
			PCOLR3	= COLPM3[$D015]
708	$2C4	5	COLOR0 - COLOR4	Playfield color registers.
			COLOR0	= COLPF0[$D106]
			COLOR1	= COLPF1[$D017]
			COLOR2	= COLPF2[$D018]
			COLOR3	= COLPF3[$D019]
			COLOR4	= COLBK[$D01A]

713	$2C9	23	SPARE	**
736	$2E0	2	GLBABS	Contains entry address of code for auto-boot / run
738	$2E1	2	SPARE	**
740	$2E4	1	RAMSIZ	Size in pages of available RAM permanently retains RAM top address contained in TRAMSZ[$6] with BASIC and 48K this = $160 = 40960
741	$2E5	2	MEMTOP	Top of available user memory RAMSIZ less display list and display memory. (first nonuseable address) This value established by powerup logic and reset re-established when screen display is opened
743	$2E7	2	MEMLO	Bottom of available user memory established at powerup and reset, not altered after that
745	$2E9	1	SPARE	**
746	$2EA	4	DVSTAT	Device status buffer Get status command puts information in these bytes
750	$2EE	1	CBAUDL	Cassette baud rate low byte
751	$2EF	1	CBAUDH	Cassette baud rate high byte
752	$2F0	1	CRSINH	Cursor inhibit flag if = 0 then cursor on. If > 0 then no visible cursor
753	$2F1	1	KEYDEL	Key delay set to 3 whenever key code accepted. Decremented every 1 / 60 sec by stage 2 VBLANK process until it reaches 0
754	$2F2	1	CH1	Prior key code read and accepted. Current key pressed compared with contents of CH1 if same then debounce time checked if OK then accepted if current key not same as CH1 then accepted. When accepted stored in CH[$2FC]
755	$2F3	1	CHACT	Shadow for CHACTL[$D401] char control register
			bit 2 = 1	causes current character line to invert sampled at every char. line
			bit 1 = 2	in 40 char. mode if bit 7 of current char. code = 1 then char is blue on white
			bit 0 = 1	in 40 char. mode if bit 7 of current char. code = 1 then char. will be blank. blinking char. produced by setting bit 7 of char. and periodically changing bit 0 here
756	$2F4	1	CHBAS	Vector to page address of character set init'd to E0 (upper case and punctuation) char set in ROM is $E000-$E3FF shadow for CHBASE[$D409]
757	$2F5	5	SPARE	**
762	$2Fa	1	CHAR	Contains internal code corresponding to what is in ATACHR[$2FB]. This will be converted to ATASCII
763	$2FB	1	ATACHR	ATASCII character for most recent char read or written or value of the graphics point. This value also determines color of line in draw and fill commands.
764	$2FC	1	CH	Holds keyboard code for a character (not ATASCII) keyboard handler gets all data from here when it gets a character it writes $FF here to indicate code read. This location loaded when a key is pressed causing an IRQ interrupt which vectors at $208. This interrupt service routine loads the code into $2FC for processing at VBLANK stage 2
765	$2FD	1	FILDAT	Right fill data for draw
766	$2FE	1	DSPFLG	Display flag will allow control codes other than EOL [$98] to be displayed if flag <> 0. If flag = 0 then control codes processed normally
767	$2FF	1	SSFLAG	Start / stop flag toggled by control-1 keys cleared by break key, reset key, or powerup

PAGE 3

DCB DEVICE CONTROL BLOCK

Used for handler / SIO communication and between user and disk handler.

768	$300	1	DDEVIC	Pheripheral unit 1 bus I.D. number
769	$301	1	DUNIT	Unit number
770	$302	1	DCOMND	Bus command
771	$303	1	DSTATS	Command type status return
772	$304	2	DBUFLO	Data buffer pointer. Set by handler to indicate source or destination data buffer

TO BE CONTINUED IN ANOTHER ISSUE

SOFT Unlimited

We Stress Documentation And User Support Above All Else. For Less. Mail chk/Money Order to:

SOFT UNLIMITED
2546 PILGRIM LANE
PLYMOUTH, MINN. 55441
(612)-542-1027 (evs.)

Add $1. shipping/item
Foriegn orders add $3.
Orders shipped 1st Class

Also For The ATARI

CLOCK - (16K CAS) $15.00
*Real Time Clock-12/24 hr.
*Constant Display/accurate
*Displays above work area

TYPEWRITER (16K CAS) $20.00
*Emulate Normal Typewriter
*Line Oriented Edittor
*CAS/DISK Filing

FINANCIER (16K CAS) $15.00
*Tax Writeoff Evaluation
*Profit Analysis
*Retirement Plan Analysis
*Loan & Investment

GRAPHER I (16K CAS) $15.00
*LINE and BAR Graphing
*Data Storage/Retrieval

ADDRESSER (16K CAS) $15.00
*Mailing List Program
*Cassette Filing

ATARI Disk Owners, This Is It.
The Ultimate DISKIO Combination.

ULTRACOPY

Tired of constantly swapping disks while you copy using a single drive? Do you two drive owners want to copy disk to disk even faster (and with verify)? Look at these features:

* The 1st Compaction Copier For ATARI
* Very Fast Disk Copy
* Uses Data Compression Techniques
  -Copy Most Game Disks in one pass
  -Minimize Writing Time for any copy
* Interactive Copy Sector Selector
  -Skip Bad Sectors
  -Copy Only Specified Sectors
* Sector Peek Option
* Disk Format Option
* Single/Multiple Drive Capability
* 100% Assembly Code
* Will Run On Any Size ATARI 400/800

Introductory priced at $20.00
Diskedit owners: $12.00

DISKEDIT 2.0

Stumped over trying to back up boot disks? Want to stop the noisy load caused by bad sectors? Or do you want to learn all about disk storage and I/O? At last, a well priced program that has the following features:

* Fast Disk Copy/Mapper
* HEX & ASCII Sector View/Write
* User friendly Sector Editor
* Data Mover: Disk to Memory
* 6502 Disassembler w/Offsets
* Single/Multiple Drive Capability
* Hex/Dec & Boolean Calculator
* Selectable Printer Output
* >75% Assembly code for speed
* ASCII, Hex, and Dec. I/O Options
* Single Key Entry
* Super Search w/Wildcards
* Format Option
* Listable/req. 24K

Introductory priced at $22.00
DISKEDIT 1.0 owners: $5.00

NEW FOR YOUR ATARI

MAGIC MAIL*

An exciting New Data Base Mailing and Personal Information System for your Atari 400/800** Personal Computer. Never before have all these features been designed into a single Mailing and Information System, so easy to use and so powerful.

COMPARE THESE FEATURES:

- Data Fields: Name, Address, City, State, Zip Code, Area Code, Phone Number, Birthday (m/d/y), and Entry Type.
- Up to 1027 records per Diskette!
- Less than 1 second Search Time over 95% of your Data, and 2-4 seconds over the other 5%.***
- Up to 62 SEPARATE and UNIQUE files permitted per Diskette.
- Single or Double Disk Drive Capability.
- Built in SORT, capable of Sorting ANY Data File by ANY Field with up to 10 Sub-fields.
- Command-Driven with simple English-like commands: FIND, MODIFY, PRINT, ADD, SORT, etc.
- Position Independent & Position Dependent Fields.
- Files compatible with Atari DOS II.**
- Recorded on High-Quality Verbatim Diskettes.
- Every Diskette Pre-tested for Bad Sectors and recording integrity.
- Versions for: Epson MX-80, Prowriter, Centronics
- Print Single-width Mailing Labels or Directory Listing.
- 100% Machine Language.
- 16 K Minimum Memory.
- 60-Page User Manual.
- 90 Day Buyer Protection Guarantee.

Call or write for FREE additional information.

*MAGIC MAIL is a Trademark of A-BIT-BETTER Software
**ATARI is a Registered Trademark of Atari Inc.
***Search time is for an Indexed File.

ABBS
A-Bit-Better Software
Post Office Box 28
Laurel Md 20707
(301) 953-7256

Dealer Inquiries Invited.

ONLY $59.95 *Plus tax, shipping and handling

VISA AND MASTERCARD ACCEPTED.

ATARI®

PAYROLL SOFTWARE FOR THE ATARI® 800™

Miles Payroll System™ is an advanced and comprehensive payroll accounting system designed for businesses today. Cumulative totals are maintained for each employee, as well as complete reporting, check writing, and W-2 reporting. Some features include:

- Random access file organization for fast updating of individual records.
- Allows weekly, biweekly, semimonthly or monthly pay periods.
- Completely menu-driven and user-friendly.
- Regular, Overtime, Double time, Sick, Holiday, Vacation, Bonus and Commission earning categories.
- Payroll deductions include Federal W/H Tax, State W/H Tax, City W/H Tax, FICA, SDI, Group Insurance and 3 user-defined deductions.
- Tax sheltered annuity deduction capability for IRAs and other tax shelters.
- State and Federal Unemployment Insurance maintained.
- Complete file viewing and editing capability.
- Maintains up to 50 employees.
- Up to 10 user-defined Worker's Compensation classifications.
- Federal Tax tables may be changed in only 15 minutes each year by user when IRS changes tax.
- Table method used for State and City Tax, allowing compatibility with any state's or city's tax.
- Produces 15 different reports, including W-2 Forms Report.
- Checks calculated and printed automatically.
- PROGRAM ENABLING MODULE™ protects valuable payroll information from unauthorized users.
- 3 user-defined payroll deductions to accommodate customized needs such as savings, profit sharing, tax shelters, pensions, etc.
- Pay period, monthly, quarterly and yearly cumulative totals maintained for each employee.
- Automatic input error detection and recovery protects system from user-generated errors.
- Easy-to-follow, detailed, and comprehensive user's manual and tutorial leads the user step by step allowing anyone with little computer experience to easily operate the package. Includes index.
- Color, sound, and graphics utilized for user ease.
- Maintains employee pay history.
- Allows for manual payroll check writing.
- Packaged in a handsome 3-ring deluxe pocketed binder with 3 diskettes and manual.
- Reasonable price.

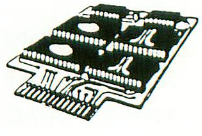
See your local store, or contact Miles Computing.

Miles™

MILES COMPUTING
7136 Haskell Ave. #204
Van Nuys, CA 91406
(213) 994-6279

Atari is a registered trademark of Atari, Inc.
Miles Computing, MILES PAYROLL SYSTEM, PROGRAM ENABLING MODULE are trademarks of Miles Computing, Van Nuys, California. Not affiliated with Atari, Inc.
$179.95. Requires 32K and two Atari® 810™ disk drivers. Payment in U.S. funds required with order. California residents add 6.5% sales tax. C.O.D. or prepayment only. Dealer inquires welcome.

HYPERCARTRIDGE™ for ATARI® 400/800 *



16K $39
w/o EPROMs/ROMs

FOR SOFTWARE DEVELOPERS AND HOBBYISTS!

- extend memory of 16K RAM and 32K RAM computers
- create 16K cartridges easily with an EPROM programmer
- combine ATARI® BASIC ROMs with your own subroutines on ROM/EPROM
- eliminate need for disk drive and extra RAM for lengthy programs

CONFIGURATIONS:
#1 Any combination of 4 2532 EPROMs/2332 ROMs
#2 Two ATARI ROMs and two 2532's (or 2332's)
SPECIFY WITH ORDER

2532 4K EPROMs
$7.50 each
with cartridge order only

CHAMELEON COMPUTING™
Dept. of Physics & Astronomy, Box 119-A
Dickinson College, Carlisle, PA 17013
(717) 245-1717

Please add: $1.50 shipping/handling
PA residents add 6% sales tax
Quantity discounts available CHECK, MC, VISA

* Trademark of ATARI, INC.

ATTENTION PROGRAMMERS!!

DATASOFT is currently seeking programs and programmers to add to their rapidly growing and expanding operation. A leading marketer and developer of personal computer software, DATASOFT offers experienced assembly-language programmers the opportunity to join their staff to develop and translate arcade games such as ZAXXON™, as well as to author original material for their games, education and home management product lines. DATASOFT pays competitive salaries, plus bonuses based on product performance. Relocation assistance is available, if needed.

If you have working knowledge of Atari, Apple, TI, or Commodore operating systems, graphics, animation and sound, call or write Melinda Storch at:

Datasoft Inc.®
COMPUTER SOFTWARE
9421 Winnetka Ave.
Chatsworth, CA 91311
(213) 701-5161 / (800) 423-5916

ZAXXON and SEGA are registered trademarks of Sega Enterprises.
DATASOFT is a registered trademark of Datasoft, Inc.

electronic home banking with the Atari 400/800*

The Microconnection, after months of rigorous competitive evaluations, was selected by Citibank of NY as the modem to be used in its electronic home banking service.

Citibank selected the bus decoding A2A Microconnection, a direct connect modem for the Atari 400 or 800*, which eliminates the requirement for the 850 Expansion Interface Module* and at the same time provides an RS-232C output to drive serial printers and other peripherals.

The Autodial, bus decoding Microconnection provides easy, low cost access to expanding information and transactional services and enhances the peripheral capabilities of the Atari 400/800 computers.

RS-232 versions of the Microconnection are also available.

the microperipheral corporation
2565 - 152nd Avenue N.E., Redmond, WA 98052
(206) 881-7544

*Registered Trademark of Atari, Inc

PROTECT YOUR COMPUTER



We'll use your company's logo upon request

special $8.99

COMPUTER COVER

Features heavy duty canvas with vinyl interior-waterproof.

ATARI-800/AC-8	$8.99	EPSON/MX-80	$8.99
ATARI-400/AC-4	$8.99	EPSON/MX-80FT	$8.99
ATARI-810/AD-D	$8.99	IBM PC PRINTER	$8.99
		OKIDATA/μ82A	$8.99

Mail Order
SOFTWARE GALLERY
P.O. Box 3354
Cherry Hill, N.J. 08034
Call: (609) 424-7106
Add $2 for postage and handling. N.J. residents add 5% sales tax.

Dealer & Distributor
Universal TRAV-LER INC.
359 Wales Ave.
New York, N.Y. 10454
Call: (212) 993-7100

NOTE: Atari, Epson, IBM and Okidata are registered trademarks.

Put Your Favorite Picture On Your Atari!

Send the photographs you want digitized.



$15.00 for the first photo.
$8.00 for each additional photo.

You will receive a floppy disk containing the photos in digitized form along with the original photos.

Also included on the floppy disk are:
(1) a BASIC program to load the pictures.
(2) a simple paint program for drawing on, modifying, and resaving the images.

You must have an Atari with the GITA chip (GRAPHICS mode 9 is used) and at least 32K of memory.

Enclose check with photographs. Send to:
Computer Techniques
329 North Harvard Street
Allston, Mass. 02134

Please make photographs no larger than 5 1/2 x 5 1/2 or send photographs which may be folded.

HCMS

Quest for the Scroll

A New-Generation Adventure Written by Dan Holme

You, as the mighty Koran, search for the scroll of Xarlog. You will seek TRUTH. If you find it, you may leap the Great Dividing Wall and on to the QUEST FOR LOVE, but your search could take you in another direction, down a path to DEATH!
Are you daring, imaginative and defiant, willing to seek the truth? Are you prepared to meet challenge?

24K Cassette **$16.95**

Personal Finance On Cassette

- Handles 100 catagories
- Income & Balance Sheets
- Checkbook & Credit Card
- Totals for categories
- Personal & Business

32K Disk or Cassette

$69.95

ACR

is a professional Business Package which for a period of six months has been used by retailers throughout the United States and Canada.

REPORTS

- COST AVERAGING
- PROFITS
- COST OF GOODS SOLD
- PHYSICAL CHECK LIST
- RETAIL PRICE LIST
- TURN REPORT
- CUSTOMER BACK ORDER
- VENDOR BACK ORDER
- PURCHASE ORDERS
- RECEIVING RECORDS

FEATURES

- DEFINABLE PASSWORD OPER.
- 40 COLUMN CASH RECEIPT
- 80 COLUMN CASH RECEIPT
- MACH. LANG. ROUTINES
- SUPPORTS 1 OR 2 DRIVES
- COMPLETE INV. CONTROL
- INVOICE NUMBERING
- 48K - 700 ITEMS
- 32K - 350 ITEMS

$199.95

ASL

ATARI SUPER LEDGER, written by a CPA, to be an accurate, flexible method of keeping business records. Can be adapted to a variety of businesses. Designed to accomodate five journals. Three are supplied, and *COMING SOON*, Payables, Receivables & Payroll. Supports Cash Receipts, Cash Disbursements and General Journal.

FEATURES

- All input is verified before processing
- 5000 Entries per journal per month
- Cash or accrual
- General ledger transaction reviews on screen or printer
- Up to 300 accounts
- Prints income statement and balance sheet
- Fail-safe disk operation
- Compatable with ACR

48K Disk

$349.95

Cassette Checkbook

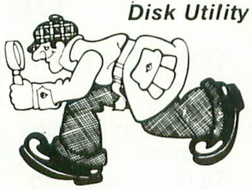
Balancer Program

- Multiple Accounts
- Creative Use of Graphics

$14.95

SHERLOCK

Disk Utility



ALL THIS IN ONE POWERFUL PACKAGE
FEATURES:

- Disk-Disassembler
- Mach. Language Speed
- Sector Dump in HEX or ASCII Formats
- Change/Delete Bytes in Sectors
- Complete Map of Standard and Non Standard Sectors
- Works With All Formats
- Byte Search Capabilities
- Sector by Sector Disk Copy Utility

by THE **4th Works**

ONLY **$49.95**

65,132 BYTES OF RAM-PAGE

64K RAM

ACCESSIBLE MEMORY for the ATARI 400/800 personal computer

- Utilizes 64K RAMS
- Plug in Installation for the 800 Provides up to 96K RAM
- Compatible With All Languages and the New B-ROMS
- Access is as Simple as a Poke or Store Command

$249.95

DEALER INQUIRIES INVITED

Orderline: (303) 427-9036

VISA And MC Accepted
$2.00 Shipping and Handling
Please add $1.50 for COD
COLO. RES., PLEASE ADD 6.5% TAX

**ATARI is a registered trademark of ATARI, INC.*

HIGH COUNTRY MICROSYSTEMS
P. O. BOX 21147
DENVER, CO. 80221

ATARI 400/800 UPGRADES FROM NEWELL INDUSTRIES
GET THE MOST OUT YOUR COMPUTER

FASTCHIP - ATARI 400/800 $41.95

FASTCHIP can give you up to three and 1/2 times the speed of the original floating point routines. Atari BASIC uses these routines for almost everything. FASTCHIP is a pin compatible ROM that replaces the original. It can be installed in minutes, and is a permanent replacement for the original rom. There are no modifications, cuts, or wires to add. FASTCHIP comes with a 90 day full warranty. Return undamaged during this period for a full refund.
Some reference times (in seconds) (in 1000 loop):

FUNC:	OLD ROM:	FASTCHIP	FUNC:	OLD ROM:	FASTCHIP
ATN	128	62	CLOG	120	30
LOG	129	33	EXP	112	34
^	236	65	COS	84	33
SIN	85	30	SQR	135	55

RAMROD MMOS - ATARI 800 ONLY $159.95 (less memory)

RAMROD is a new operating system board that replaces the existing board. It gives the user the flexibility of using either the existing operating system roms or it is switch selectable to use EPROMS. This allows the user to change the operating system to meet any needs that might arise.

RAMROD also addresses the 4K of memory not currently accessible in the system. It also is switch selectable and may be used as RAM, ROM, or a combination. This ram is usable by software such as SPREADSHEETS, WORD PROCESSORS, and certain LANGUAGES to mention a few, without modification to the existing operating system. Complete with instructions and recommended modifications. 1 year warranty.

PLUS, every board comes with SUPERMON!, a resident machine language monitor written by David Young. It features many powerful debugging commands like display/ alter memory, disassembler, printer and disk interface, etc. The disk interface has many features, including the ability to access single or multiple sectors in sequential or linked mode, S/D or D/D. And you can call it up at any time. A sophisticated yet simple program to use.

WITH 4K RAM $169.95
WITH 12K MEMORY (4K RAM, 8K EPROM) $189.95

PRO BOWLING VERSION THREE - ATARI 400/800 $24.95

This game is written in Basic and machine language and is an accurate simulation of the sport of bowling. There are ten skill levels to give challenge to the best of computer game players. Features redesigned character set, automatic scoring, sound, and P.M. graphics.
REQUIRED ACCESSORIES:
DISK DRIVE
BASIC LANGUAGE CARTRIDGE 32K MIN. MEM.
ONE JOYSTICK CONTROLLER PER PLAYER

ATARI SOFTWARE(LIMITED SUPPLY)

ENTERTAINER/CX481	$59
MISSILE COMMAND/CXL4012	$24
STARRAIDERS/CXL4011	$27
CONV FRENCH/CX4119	$33
STOCK ANALYSIS/CX8107	$14
STOCK CHARTING/CX8108	$17
BOND ANALYSIS/CX8106	$14
MORT & LOAN ANALYSIS/CX4115	$11
MAIL LIST/CX4104	$13
ENERGY CZAR/CX4121	$11
EDUCATION CARTRIDGE/CXL4001	$15
BUSINESS COMMUNICATIONS/CX6010	$17
SUPERVISORY SKILLS/CX6003	$17
MUSIC COMPOSER/CXL4007	$30
VIDEO EASEL/CXL4005	$20
COMPUTER CHESS/CXL4009	$26
BASKETBALL/CXL4004	$20
EDUWARE COMPUMATH DECIMALS/CASS	$16
EDUWARE COMPUMATH FRAC./CASS	$16
JAWBREAKER/DISK	$18

To order:Call 214-423-1781 or send check or money order to NEWELL INDUSTRIES, 3340 Nottingham ln., Plano TX. 75074. Texas residents add 5% sales tax. Orders outside the U.S. add 3% for shipping. C.O.D. orders add $1.50. Sorry, no charge cards. Call or write for additional information. Dealer inquiries welcome.
All NEWELL products also distributed by JERSEY SYSTEMS 800-526-3647. In NJ. 201-821-9441.

ATARI 400/800 are Trademarks of ATARI INC.

MILES PAYROLL SYSTEM

(payroll / accounting program)
Miles Computing
7136 Haskell Ave., #204
Van Nuys, CA 91406
(213) 994-6279
$179.95
32K Diskette,
two disk drives required

An advanced and comprehensive payroll accounting system that maintains records for up to 50 employees. This menu-driven program produces 15 different types of reports, and prints payroll checks. It figures all deductions including taxes, unemployment insurance and Worker's Compensation.

STRATOS

(game)
Adventure International
P.O. Box 32750
Longwood, FL 32750
(800) 327-7172, orders only
(305) 862-7172, business
$34.95
16K Cassette
32K Diskette

In this space-war game the capitol city of New Earth — Stratos — is invaded by the M'korg, a race of slug-like beings. Stratos defends itself from attack by using the Armageddon Wave Device and the Force Envelope. A simple but imaginative arcade type game.

INSIDE ATARI BASIC

(book)
Reston Publishing Co., Inc.
Reston, VA 22090
$12.95

Friendly, is the word to describe this introduction to Atari BASIC. Illustrations and examples provide a walking tour through the bewilderness of BASIC. It's as good a start as you can get before leaving the beaten path. Includes simple color and sound commands.

PICNIC PARANOIA

(game)
Synapse Software
5327 Jacuzzi St., Suite I
Richmond, CA 94804
(415) 527-7751
$35.00
16K Cassette
32K Diskette

This game of many levels pits you and your picnic lunch against the depredations of ants, spiders and wasps. The insects are bent on stealing your food in front of your very eyes, and will succeed unless you are an agile swatter. Many little things are happening at once in this frustrating contest. It's enough to make you want to eat indoors.

MAGIC MAIL

(data-base mailing manager)
A Bit Better Software
P.O. Box 28
Laurel, MD 20707
(301) 953-7256
$59.95 — Diskette

John Doe
123 Mainstreet
Anytown, State, 12345
(555) 456-7890
12/25/39 — friend

This is the kind of record Magic Mail will let you keep — 1027 of them per diskette in up to 62 separate files. They are fully searchable and sortable, usually within a second or so. Lists and labels are possible with Epson, Prowriter or Centronics (Atari) printers. Files compatible with Atari DOS.

SEA DRAGON

(game)
Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 327-7172
$34.95
32K — Diskette
16K — Cassette

As the sub commander you face a tough task destroying or evading a forest of mines and a surface patrol out for your hide. There are 32 screens that scroll horizontally past a complicated sea bottom. Meanwhile your air is being consumed, and you must surface to resupply — at extra risk.

E.T. PHONE HOME

Atari, Inc.
1265 Borregas Ave.
Sunnyvale, CA 94086
$44.95
16K — Cartridge

Based on the movie "E.T.," this game employs high-resolution graphics and scrolling playfield to recreate the earthly dilemma of our favorite alien. The player helps E.T. contact his ship and elude capture by scientists and government agents. Available soon.

SPACE SHUTTLE

(simulation)
Swifty Software
64 Broad Hollow Road
Melville, NY 11747
$29.95
32K — Diskette

Pilot the Space Shuttle through lift-off, booster separation, orbit and landing. Your references include realistic control panel indicators plus a video screen showing objective view of lift-

continued on next page

off and subjective view of landing. Failure to fly within tolerance creates emergency situations, and if correction is not swift and proper, your mission makes the evening news.

MAC-65

(macro assembler)
Optimized Systems Software
10379 Lansdale Ave.
Cupertino, CA 95014
(408) 446-3099
$80.00
48K Diskette

OSS says this is "the finest integrated Assembly Language development system yet." Ideal for writing small as well as large routines, it significantly reduces the rigamarole required by other macro systems. MAC-65 is compatible with EASMD (also from OSS) and the Atari Assembler / Editor cartridge. Object code produced is compatible with Atari DOS, OS / A +, and even Apple DOS.

RAMROD

(operating system board)
Newell Industries
3340 Nottingham Lane
Plano, TX 75074
(214) 423-1781
$115.95
ATARI 800 only
4K or 12K optional at additional cost

RAMROD is a new operating system board to replace the existing 10K OS board from Atari. Main advantage of RAMROD is to free up more of the 800's potential 64K of RAM space by using less than the Atari OS. However, Atari OS is retained on RAMROD and may be switched-in when desired. Excellent for spreadsheet and word-processor programs, and useful for some languages.

ATARI 400 48K UPGRADE KIT

(memory expansion)
Micro Systems Exchange
P.O. Box 4033
Concord, CA 94524
(415) 355-7130
$99.95

This kit contains the necessary chips, wiring and resistors to upgrade the ATARI 400 to a 48K computer. The instructions are designed for the novice, and lead through a *simple* installation procedure.

Use your current memory board so as not to change in any way the designed features of the ATARI 400. The memory chips *replace* the chips on the memory board (all are pop-outs). Several small wires must be soldered.

WORDFUN!

(educational game)
Milliken Publishing
1100 Research Blvd.
St. Louis, MO 63132
(314) 991-4220
$29.95 (pkg. of two)

Four new WordFun! games are available on cassette or diskette to help teach vocabulary, word structure and spelling. Designed for elementary school students, the WordFun! games join the twelve MathFun! products already available from Milliken.

SWAMP CHOMP

(game)
Program Design, Inc.
11 Idar Court
Greenwich, CT 06830
(203) 661-8799

In the eerie land of Muckedoo you still have to eat, without being eaten by the swamp denizens. Thirteen levels of play challenge one or two players against the clock. Game designed by John Konopa, winner of an Arkie award for "Moonbase Io."

PDI also announces "Step by Step," a program to teach BASIC.

TAXMAN-83

(tax management program)
Atsuko Computing International
303 Williams Avenue, Suite 1132
Huntsville, AL 35801
(205) 533-7590
$95.00
Diskette

This tax management program prepares and and prints 1982 individual income tax returns. It needs a VisiCalc or SuperCalc electronic spreadsheet. All forms and schedules are included, and multiple overlays consider all tax alternatives to compute the lowest legal tax. Compares results with previous year's.

PRINTMATE 150

(printers)
Micro Peripherals, Inc.
4426 S. Century Dr.
Salt Lake City, UT 84107
(801) 263-3081
$995 - $1,225

Four models of dot-matrix printers from MPI offer a range of features at 150 characters per second.

B1 — 2K Buffer — $995
A1 — 4K Buffer & Softswitch — $1125
B2 — 20K Buffer — $1,095
A2 — 20K Buffer & Softswitch — $1,225

Softswitch is a keypad controlling form length, print density, tabs, baud rate and font.

GALAXIANS

(game)
Atari, Inc.
1265 Borregas Ave.
Sunnyvale, CA 94086
$44.95
16K — Cartridge

An exciting adaptation of the classic arcade game, this features relentlessly attacking invaders that swoop down in a complex and difficult S-curve. Player must blast invaders out of the sky. Successive waves of attackers become faster and more powerful.

ATARI MUSIC 1

(educational)
Atari, Inc.
1265 Borregas Ave.
Sunnyvale, CA 94086
$49.95
16K — Cassette & Diskette

Teaches fundamentals of music to children and adults. Includes note reading, steps, major scales, and major keys. Four lessons use tutorial approach, including drill, experimentation and test. Success rewarded by built-in video games. Joystick required.

SPEEDWAY BLAST

(game)
IDSI
P.O. Box 1658
Las Cruces, N.M. 88004
$39.95
16K — Cartridge

Steer your car around the neighborhood and rid it of asphalt eating monsters without crashing. Other dangers await the proficient driver. Scrolling screens add to the difficulty here.

CAPTAIN COSMO

(game)
NEXA Corporation
P.O. Box 26468
San Francisco, CA 94126-6468
$35.00
32K Diskette

Up to four players can enjoy this arcade-style game where Captain Cosmo defends the universe from the dreaded Munchies. Our hero attempts to trap and zap these Munchies but is constantly thwarted by his arch enemy, Devious Dan. A cute but complex game.

STARFIGHTER SLIK STIK

(joysticks)
Suncom, Inc.
270 Holbrook Dr.
Wheeling, IL 60090
(312) 541-8816
$16.95 (Starfighter)
$ 9.95 (Slik Stik)

Suncom offers two new joysticks, a special left-handed adaptor and a six-foot extension cable. Starfighter, called "the ultimate joystick," is a standard controller with a unique two-year warranty. Slik Stick has a ball head. "Lefty" (adaptor) retails at $9.95 and the cable costs $6.95.

ATARI'S MOTHER TONGUE

by DANIEL GRAU

It seems not so long ago that I was programming my microcomputer by keying-in lists of hexadecimal numbers, and I was fortunate. Altair and Imsai owners had to enter their bootstrap programs by toggling an array of 24 switches for each byte of data. At that time I was the proud owner of a MOS Technology KIM microcomputer with a 6502 microprocessor and, yes, one whole kilobyte of memory.

Nowadays there are tools, like the wonderful Assembler Editor cartridge by Atari, for those who want to speak to the machine in its mother tongue. The 6502 machine language is one of the most elegant and efficient of all microcomputer languages, and it's my pleasure to share some information to help you learn to use this language.

The Atari Assembler Editor Manual assumes that the reader is already familiar with Assembly Language, and suggests, as suitable study texts, Lance Leventhal's *6502 Assembly Language Programming* and *Programming the 6502* by Rodnay Zaks. In Appendix B, the *6502 Programming Manual* is added to the list. I will summarily review these and other well-known books.

6502 Assembly Language Programming and its companion, *Assembly Language Subroutines*, by Lance Leventhal (Osborne-McGraw Hill) are outstanding books. Both have extensive and very clear explanations of programming, 6502 architecture and Assembler instruction sets. The former also explains Assemblers, input / output operations, peripheral chips and 6502 interrupts. However, they are not easy reading for rank beginners.

Programming the 6502, by Rodnay Zaks (Sybex), deserves a note of caution. The first edition was full of errors. The editors put out a revised second edition, and later a third. Edition three still contains confused notions and some errors. The writer might be proficient with the 8080 — or perhaps even the 6800 — but not with the 6502. For instance, one program assumes that "load accumulator" (LDA) does not set the zero flag, which is true for the 8080. Another place, bit 7 is tested by loading the accumulator and then using the bit test instruction (BIT). This is needed in the 6800, but not in the 6502. These examples are not isolated, I can quote them by the fistful.

The *SY6500/MCS6500 Microcomputer Family Programming Manual* by SYNERTEK (3050 Coronado Drive, Santa Clara, CA 94086) is a reprint of the original manual by MOS Technology, the inventors of the 6502 chip. A pocketbook version can be had from Rockwell International Corp. (P.O. Box 3669, Anaheim, CA 92803).

This is *the* mother manual. Large chunks of its tables, addressing modes descriptions, lists of mnemonics and execution times, etc., can now be found in other texts. Since the beginner's first task is to learn the instruction set and the way the 6502 works, and considering that this book set the rules, it is a *must* for the library of any 6502 programmer. It is clearly written, well explained and not expensive. Still, it is not sufficient as a learning text for the rank beginner.

6502 Software Design, by Leo J. Scanlon (Sams & Co., Inc.) is one of the best choices for learning Assembly Language. While some program examples are oriented specifically to the Rockwell AIM single-board computer, this in no way detracts from the perfect understanding of the programming algorithms and processes. If you buy only one book, let it be this one.

The ATARI Assembler, by Don and Kurt Inman, is very difficult to recommend. Did either of them ever program in 6502 Assembler? If so, why endow the 6502 with a 16-bit stack pointer? (Fig. 1–5). On pages 7 and 87 they again assert that "the stack pointer and program counter are large enough to hold a full length address (0 to 65535)." In spite of this, this book has the virtue of familiarizing the reader with the ATARI Assembler cartridge, and does so somewhat better than the Atari Assembler Editor Manual itself. However, do not expect to learn to program in Assembly Language from this book alone. You will need previous knowledge of the way the 6502 and its instruction set work.

Beyond Games: Systems Software for your 6502 Personal Computer, by Ken Skier is, without doubt, very interesting. After 13 chapters of tutorial information (also with some trivial errors), we are treated to program listings of working monitors, disassemblers and text editors for the OSI, the Apple and the ATARI computers. These programs could be employed in lieu of the Atari Assembler cartridge to learn how to program in machine language, and do not use any subroutine of the ATARI Operating System. The author has programmed his own set, since, as he says, the ATARI's power "breeds complexity".

This brings us to the most pressing problem the aspiring ATARI Assembler Language programmer will have: how to integrate machine language programs into the ATARI system. The hardware and Operating System manuals give scant information on the way the various subroutines work. The program listings, which cost another twenty dollars, do not even contain the disk operating system, or the printer output routines. It is also fairly difficult to transfer the assembled machine language programs in memory into BASIC program, which is where many of us will want to put them.

We still need a book which describes all the routines, memory addresses, logic diagrams, chip signals, and many more things hidden in the innards of the ATARI. Let us hope that someone eventually will write it; and, until then, let's also hope that the wait is short.

GOTO DIRECTORY

ALABAMA

RAINBOW CITY SERVICE CENTER
244 Rainbow Plaza
Gadsen, AL 35901
205-442-5384
Factory authorized service on ATARI VCS and computers. Parts and accessories.

ARIZONA

COMPUTER WAREHOUSE
2222 E. Indian School Rd.
Phoenix, AZ 85016
800-528-1054
602-954-6109
ATARI 400 & 800 computers and peripherals at the best prices in the country. Call 1-800-528-1054. Ask about our ATARI 800 special system and the ATARI 400 Pac-Man special. We ship nationwide.

CALIFORNIA

THE SOFTWARE STORE
11768 West Pico
Los Angeles, CA 90064
213-473-1136
Software for ATARI computers. APX—third party—ATARI books-magazines.

HW COMPUTERS
19511 Business Center Drive
Northridge, CA 91324
213-886-9200
Full line of personal computers. Atari, TRS-80, Fortune, NEC, California Computer Systems. Complete line of software and hardware. Authorized Service Center. Other locations: Westwood, Redondo Beach and Palm Springs.

DIMENSIONAL SOFTWARE
3954 Clairemont Mesa Blvd.
San Diego, CA 92117
714-275-4243
Software/books/peripherals/hardware

SOFTWARE EMPORIUM
4500 El Camino Real
Los Altos, CA 94022
415-941-8788
1800 S. Bascom Ave.
Campbell, CA
408-377-9311
Complete software selection for ATARI, Apple, Tandy, IBM, CP/M, books, magazines, games.

SUNSET COMPUTERS
2329 Irving
San Francisco, CA 94122
415-665-7378
ATARI hardware, software, peripherals. Repairs—Northstar, Franklin, Osborne, Kaycomb. Books, magazines.

DATA BANKS
3820 Peralta Blvd.
Fremont, CA 94536
415-790-1060
Hardwdare/software/services/peripherals and a full line of supplies for all ATARI products.

3E SOFTWARE AND SYSTEMS
22408 Mission Blvd.
Hayward, CA 94541
415-537-3637
Complete ATARI support center for hardware and software. ATARI, AXLON, OKIDATA, BIT 3, ALIEN, GROUP, BMC, PID, SYNAPSE, ON-LINE, SWIFTY, EPYX GEBELLI, DATASOFT, BRODERBUND, QS, SIRIUS, OSS, EPSON, ARTWORKX, & MORE.

P.C. COMPUTERS
10166 San Pablo Ave.
El Cerrito, CA 94530
415-527-6044
Software/books.

COMPUTERLAND
1815 C Ygnacio Valley Rd.
Walnut Creek, CA 94590
415-935-6502
Wide selection of software for ATARI. Programming seminars. IBM & Altos computers. Books, magazines.

ELECTRONIC FANTASY
2078 Vallo Fashion Park
Cupertino, CA 95014
ATARI computers & large selection of software. Repairs.

THE SOFTWARE CENTER
4720 Geary Blvd.
San Francisco, CA 94118
415-751-2231
An authorized ATARI dealer with the largest selection of ATARI software in S.F. Cartridges, tapes, discs, memory cards, joysticks, books, magazines, games.

COMPUTER PLACE
1670 Market St.
Redding, CA 96001
916-221-1312
Hardware from Apple-ATARI-NEC-Franklin-Commodore. Largest selection of books & magazines in Northern CA. Full line of game-educational-application software.

COMPUTER PLACE
1029 E. Broadway
Glendale, CA 91205
213-241-2551
Hardware/software/peripherals—memory expansion—ATARI voice box. Printers & color monitors—APX—modems—user group. Latest HW/SW—new products—repair all hardware—extension service policy. Mailing list.

COMPUTER STORE INT'L
215 N. Central Ave.
Glendale, CA 91207
213-243-7669
Apple—ATARI—Eagle—Franklin—NEC—largest selection of software, hardware, books and magazines you are ever likely to see under one roof. Call for hard to find items and advice. We have evaluated many, many items and found them unfit for human consumption.

COMPUTER STORE OF SAN LEANDRO
701 Macarthur Blvd.
San Leandro, CA 94577
415-569-4174
Complete ATARI 400/800 systems—business systems from Altos—books, magazines—modems—disk drives—printers—memory chips. Complete selection of games, utility, business, educational software.

DALE'S TV & RADIO INC.
2400 Athens Ave.
Redding, CA 96001
916-243-7084
Authorized ATARI service computers & home VCS game systems—TV & stereo repairs.

SOFTWARE CITY
106 El Paso Ctr.
San Jose, CA 95130
408-866-4224
Hardware—peripherals—Percom disk drives—books, magazines, games—application—educational—software fror Sirius-On-Line/Gebelli/APX/Synapse/Datasoft—computer furniture.

SOUND ROOM
1100 W. Lincoln
Anaheim, CA 92805
714-635-8621
Complete line of ATARI hardware & software—printers—disk drives—joysticks, books, magazines, software, games, utilities, educational.

THE GRAFEX COMPANY
1112 Arlington Ln.
San Jose, CA 95129
408-996-2689
Box 1558
Cupertino, CA 95015
408-996-2689 Voice 408-253-2516 BBS
Northern California's exclusive ATARI microconnection dealer. The most comprehensive selection of software and hardware for your ATARI home computer. Send $1 for catalog (refunded with your first order).

LEARNING TREE COMPUTER CENTER
2431 N. Tustin Ave.
Santa Ana, CA 92705
714-667-1575
Complete line of ATARI COMPUTERS and software products. Specializing in home, education and business software. AUTHORIZED REPAIR SERVICE CENTER for all Atari and Epson products. Atari Club meets 3rd Thurs. of each month. Write for free catalog.

CONNECTICUT

THE COMPUTER CENTER
Millrock Rd.
Old Saybrook, CT 06475
203-385-1587
ATARI hardware & software. Programming seminars, books, magazines, T.I., Northstar & Altos. Programmers wall chart available. Call or write for details.

COLORADO

ALPHA CENTER
12351 W. 64th
Arvada, CO 80004
303-421-6361
Open 7 days a week. ATARI—TI—Timex—Commodore—Corvus—NEC—Source—Epson—Prowriter. Authorized repair center.

FLORIDA

ORANGE BLOSSOM HOBBIES
1975 N.W. 36th St.
Miami, FL 33142
305-633-2522
Hardware/software/peripherals.

GEORGIA

COMPETITIVE EDGE INC.
Aberdeen Village Ctr.
Peachtree City, GA 30269
404-487-6460
All ATARI products sold below suggested retail. Computer classes in use & programming—youth & adults. Personalized evaluations of individual computer needs. Other personal & business computers available.

ILLINOIS

COMPLETE COMPUTING
890 E. Roosevelt Rd.
Lombard, IL 60148
312-620-0808
Best selection of ATARI software in western suburbs. 10% discount software club. Superb selection of books, magazines. Basic and advanced programming classes. Excellent technical support for ATARI. Loves bad puns.

VIDEO, ETC.
465 Lake Cook Rd.
Deerfield, IL 60075
312-498-9669
Hundreds of ATARI software programs including games, educational and business. Complete service. Full line of peripherals, periodicals & books. VIDEO ETC. Deerfield, 498-9669; Buffalo Grv, 459-6677; Skokie, 675-3655; Orland Pk, 460-8980.

DIGITALWORLD INC.
711 Army Trail Rd.
Addison, IL 60101
312-628-9222
Complete line of all ATARI products. ATARI service center. Full line of ATARI software & a full line of books & magazines. No shipping charges on pre-paid orders or on serviced equipment.

CENTRAL SERVICE CO.
1920 W. Peterson Ave.
11714 S. Western Ave.
Chicago, IL
23 W. North Ave.
Northlake, IL
312-338-6000
3 locations to service computers, games, video recorders, video disc, televisions, stereo, microwave ovens.

KENTUCKY

CHAMCO INC.
2511 Preston Hwy.
Louisville, KY 40217
502-637-3604
Factory authorized service on ATARI video games, and home computers.

MARYLAND

FREDERICK COMPUTER PRODUCTS
5726 Industry Lane
Frederick, MD 21701
301-694-8884
ATARI hardware & great selection of software from many manufacturers. ATARI & other peripherals.

BUSINESS COMPUTER CENTER
8659 Baltimore National Pike
Ellicott City, MD 21043
301-461-2200
BCC carries the complete line of ATARI products along with one of the largest supplies of third party software and hardware available at reasonable prices. Additionally we are a full service dealer.

A-BIT-BETTER SOFTWARE
Post Office Box 28
Laurel, MD 20707
301-953-7556
A-Bit-Better Software offers you an extensive variety of exciting programs for your ATARI 400/800. Quality is a must, and our reasonable prices give us the edge. Write for free catalog.

LOWENS
7227 Wisconsin Ave.
Bethesda, MD 20814
301-652-1289
Hardware—ATARI 400/800—VIC—peripherals—Percom disk drives. Full line of ATARI and third party software. Specializing in educational & business software.

MASSACHUSETTS

CUSTOM ELECTRONICS INC.
238 Exchange
Chicopee, MA 01013
413-592-4761
Hardware, software, peripherals—service for ATARI products. Guaranteed to satisfy your needs. We are "the business which service built". Now in our 22nd year.

THE BIT BUCKET
1294 Washington St.
West Newton, MA 02165
617-964-3080
The widest selection of ATARI hardware

GOTO DIRECTORY

and software in New England. Authorized ATARI repair. Books & magazines. Seminars and classes for ATARI. Also carrying Osborne, Altos, and Timex.

MICHIGAN

BINARY CORP.
3237 Woodword Ave.
Berkeley, MI 48072
313-548-0533
ATARI hardware & software. FASTCHIP and The Terminal program. ATARI & other peripherals. Books & magazines.

RITEWAY ENTERPRISES
8262 12 Mile Rd.
Warren, MI 48093
313-751-2454
Hardware/Software/Peripherals/books. Over 500 ATARI programs in stock. Epson—NEC—C.ITOh—Okidata printers—Percom drives—BMC monitors—Hayes. Everything for ATARI. Everything discounted everyday.

MISSOURI

INSTANT REPLAY LTD.
14422-24 S. Outer 40 Rd.
Chesterfield, MO 63017
314-576-0544
Software/books/accessories/hardware. St. Louis' complete ATARI computer center. Innovative and exclusive products like Sidewriter—a typewriter keyboard for the 400, joystick repair kits. We mail order all products.

SCREEN SONICS
14416 S. Outer 40 Road
Chesterfield, MO 63017
314-434-0433
Authorized ATARI service thats as good as ATARI. 400 & 800 computers received on Monday. Normally repaired and shipped out within 7 to 10 working days.

SCREEN SONICS
14416 S. Outer 40 Road
Chesterfield, MO 63017
314-434-0433
"Sidewriter" professional auxiliary keyboard for ATARI 400 & 800 owners that lets you sit back & enjoy your computer small businesses. Now you can have two points of entry with one computer "customer service" & products available for the serious ATARI user.

NEVADA

COMPUTER CENTER
3310 S. Jones, Suite D
Las Vegas, NV 89102
702-873-5055
ATARI computers, peripherals. Large selection of business applications & game software.

NEW JERSEY

EARTHRISE COMPUTER CENTER
6 Green Village Rd.
Madison, NJ 07940
201-377-4084
ATARI, NEC, Franklin computers. Complete software selection. Computer classes.

SOFTWARE ASYLUM, INC.
626 Roosevelt Ave.
Carteret, NJ 07008.
201-969-1900
Also Old Bridge
201-536-1401
We ARE ATARI! NJ's largest retailer of Atari programs for 400/800 models; over 400 programs available from more than 60 manufacturers. Send for our latest catalog — only $2.00 (refundable as credit with purchase).

CIRCLE VIDEO & ELECTRONIC
Circle Plaza Shopping Center
Eatontown, NJ 07724
201-542-8897
We carry ATARI hardware & software/authorized repair/books & magazines, seminars & classes. Commodore, TI & Franklin.

WAYNE COMPUTER SOFTWARE
1459 Rt. 23
Wayne, NJ 07470
(201) 628-7318
Across from Packanack Center, by Wayne Manor
Largest selection of software, peripherals, accessories and books you will ever see in one store — at super prices!!! Call for hard-to-find items and advice.

FELICES FOLLIES
66 Broad St.
Red Bank, NJ 07701
201-842-2862
Hardware/software/peripherals for ATARI/Vic20+64/T.I. 99/Timex/Sinclair/books & magazines. Printers all on display and ready for a demonstration. The most complete Micro store in Monmouth County.

VIDEO CONNECTION OF SOMERSET
900 Easton Ave.
Somerset, NJ 08873
201-545-8733
Hardware/Software/Service/Books

VIDEO STATION
4 Beachwood Rd.
Summit, NJ 07901
201-273-0024
Hardware/Software/Service

NEW YORK

LEIGH'S COMPUTER WORLD
212 E. 85th St.
New York, NY 10028
212-879-6257
ATARI hardware, software, books. Magazines, programming classes. Apple & Sinclair.

THE VIDEO CONNECTIONS
27 Merrick Ave.
Merrick, NY 11566
516-546-5050
ATARI software, books, magazines. Mention this listing for a special discount on ATARI software.

DATA SCAN COMPUTER SYSTEM
2306 N. Ocean Ave.
Farmingville, NY 11738
516-698-6285
Hardware from ATARI—VIC—NEC—IBEX. Complete business systems—books, magazines—peripherals—printers—modem—game—utility—educational software.

SOFTWARE EMPORIUM
151 Mineola Ave.
Roslyn Hts., NY 11577
516-625-0550
Specializing in a full line of ATARI & third party software—games, utilities, business, educational—books, magazines, peripherals—hardware from ATARI—Vic—Franklin—Timex—TI.

COMPUTER CENTER
31 East 31st St.
480 Lexington Ave.
333 West 57th St.
21 West St.
New York, NY
212-889-8130
Largest selection of ATARI hardware & software in New York.

OHIO

DIGITRENDS
1813 E. 12th St.
Cleveland, OH 44114
216-241-1813
Best selection in Northern Ohio for ATARI hardware, software, books, periodicals, diskettes, computer furniture and accessories. Phone orders and charge cards accepted. Prompt shipment.

ELECTRONIC CONNEXION
424 E. Stroop Rd.
Kettering, OH 45429
513-294-0222
ATARI sales and authorized service. Over 400 programs in stock. Books, magazines, software exchange.

BARNHART STORES
548 N. Main
Urbana, OH 43078
513-653-7257
Hardware/software/service/peripherals.

COMPUTER CORNER
5104 Mayfield Rd.
Lyndhurst, OH 44124
216-473-5010
ATARI hardware & software for games & business applications. Basic and advanced programming classes. Authorized service center for ATARI, Commodore, Eagle and Epsom.

DATA MANAGEMENT SYSTEM
2979 West Market St.
201 S. Main St.
Akron, OH 44308
216-666-3226
Factory authorized dealer/repairs. Software development marketing.

DALE'S COLOR TV & APPL. INC.
2324 N. Cleve. Mass. Rd.
Bath, OH 44210
216-253-4277
216-659-9330
Service only. ATARI computers and games.

WHITLOW ELECTRONIC CORP.
2150 Noble Rd. E.
Cleveland, OH 44112
216-451-1775
Computer, VCS, Audio-Video, ATARI specialists. Parts and service.

VIDEO DEPOT
1278 Euclid Ave.
Cleveland, OH 44115
216-696-3588
Second largest selection of software in Cleveland. Over 300 pieces of software, Signalmen modems, Alien Group Voice Box. Full selection of books and magazines.

OKLAHOMA

THE COMPUTER MART
9726 East 42nd St.
Tulsa, OK 74145
918-664-8452
ATARI computers & software. Northstar & Victor computers. Books & magazines.

OREGON

NORTHWEST COMPUTER SUPPORT
10200 S.W. Nimbus, G1
Portland, OR 97223
503-644-5080
At NW Computer Support we only do one thing. Every effort at every level of our company is to put your computer back on-line. We can provide you the best, fastest, and most reliable service available anywhere—at a price you can afford.

PENNSYLVANIA

1-STOP COMPUTER SHOPPE
65 N. 5th St.
Lemoine, PA 17043
717-761-6754
Hardware from ATARI—Commodore—Zenith—Osborne—Full line of peripherals & magazines, games, business, educational, utility software supplies.

AUDIO-PHONICS
1910 Passyunk Ave.
Philadelphia, PA 19145
215-463-4103
Video equipment repair/ATARI computer repair.

MCR
161 Monroe St.
Rochester, PA 15074
412-728-7615
Authorized service center.

MOSTLY COMPUTERS
36 N. George St.
York, PA 17401
717-843-3879
Complete systems from ATARI—VIC—Northstar—books—magazines—disk drives—modems—printers. Full line of business, games, utility, educational software.

CITY SOFTWARE CENTER, INC.
2712 Grant Ave.
Philadelphia, PA 19114
215-969-3330
Largest selection of third party software & ATARI software discounted up to 20%. Blank discs/books/magazines/accessories. Advice on comp. info. Call for prices. Will accept mail order/MC & Visa accepted.

TEXAS

ALAMO NATIONAL CAMERA SERVISHOP
117 W. El Prado
San Antonio, TX 78212
512-828-3575
Warranty, non-warranty repair of ATARI video games & computers. Complete repair service for photo equipment, VCR, & Video Camera.

THE ELECTRONIC SHOP
2820-24 Walnut Hill Ln.
Dallas, TX 75229
214-350-4003
An ATARI authorized repair service for computers & games.

UTAH

THE SOFTWARE HUT
470 E. 200 South
Salt Lake City, UT 84111
801-355-0066
Hardware/software/peripherals.

SERVICE WEST OF UTAH
3532 S.W. Temple
Salt lake City, UT 84115
801-262-4069
Authorized ATARI service.

QUALITY TECHNOLOGY
741 S. State St.
Salt Lake City, UT 84111
801-521-5040
Hardware, software, service.

VIRGINIA

FUTURE TEK
6230-10 Rolling Rd.
Springfield, VA 22152
703-644-0026
Hewlett Packard, Basis Computer, Audio-Video & projection TV.

continued on next page

PUBLIC DOMAIN SOFTWARE

ANTIC is pleased to add four new disks to our library of Public Domain Software for the ATARI computers. This makes a current total of nine disks. These programs are not yet available on cassette. These disks contain unprotected material from the libraries of ATARI users' groups from around the country. There are three disks of games, two disks of graphics and sound demos, and one disk containing a number of digitized photographs. Also, there are two disks of utilities, and one disk containing music files requiring the Music Composer cartridge.

The potential buyer should note that these programs are sold *as is*. Their usefulness may depend on your experience with the computer. They may contain programming quirks that require some modification. However, all perform reasonably well. Contents of the disks may vary slightly from the published description due to unforeseen circumstances, but each disk is filled to reasonable capacity with useful programs of the kind described, and represent an excellent value at $10.00 each, plus $1.50 per order for shipping/handling. Send check or money order (payable to ANTIC Publishing), and disk number(s) to: **Public Domain Software, 297 Missouri St., San Francisco, CA 94107.** Allow four weeks for delivery. All orders are sent by First-Class Mail.

ANTIC GAMES DISK #1

1. Chicken: a great game from ANTIC #1
2. Hangman: the traditional word game
3. Creation: a version of Life
4. Reverse: order of string numbers
5. Monopoly: computerized!
6. Lunar lander: select terrain (stick)
7. Escape: guide ships thru maze (stick)
8. Zonex: hidden color patterns in grid
9. Clewso: detective adventure, graphics
10. Puff: the Magic Dragon

ANTIC GAMES DISK #2

1. Speed Demon: from ANTIC #4
2. Guy' Grid Game
3. Deathstar: from ANTIC #2
4. Blackjack: Vegas rules
5. Civil War: a strategic simulation
6. Artillery: firing strategy game
7. Super Wumpus: text adventure
8. Reckless Driving: avoid collisions (stick)

ANTIC UTILITY DISK #1

1. Doc: program allows you to accompany programs with separate documentation on disk
2. Microassembler: allows you to create USR routines-assembler, more
3. Assembler-Editor: BASIC, slow but versatile
4. Num: automatic line numbering utility in BASIC
5. Memtest: runs without BASIC cartridge, to test all memory
6. Pattern: graphics demo, documented
7. Color: 128 colors at once
8. Printnop: connect parallel printer from jacks 3 & 4

ANTIC UTILITIES DISK #2

1. Bubble Sort: from ANTIC #4
2. Typo: from ANTIC #3
3. Home inventory
4. KEY 6: Cipher coding
5. Renumber
6. Compare: listings for differences
7. SUPER: menu
8. Disk label
9. Modem
10. RT clock & more

ANTIC GRAPHICS DEMO #1

1. Spider: from ANTIC #3
2. Moire
3. Rainbow
4. Horses
5. ATARI logo
6. Pallette
7. Oxygen
8. Spiral
9. Pretty
10. Message and more

ANTIC GAMES DISK #3

1. Petals
2. Showdown
3. FROG: from ANTIC #3
4. Tank Battle
5. Draw: Guy Hurt
6. Plus Zero
7. Collisi, and more

ANTIC GR. & SO. DEMO #1

1. Graphic
2. Draw
3. Rainbow
4. Giggle
5. Tune Rite
6. Etch Sketch
7. Baby Pro Sound and more

ANTIC MUSIC DISK #1

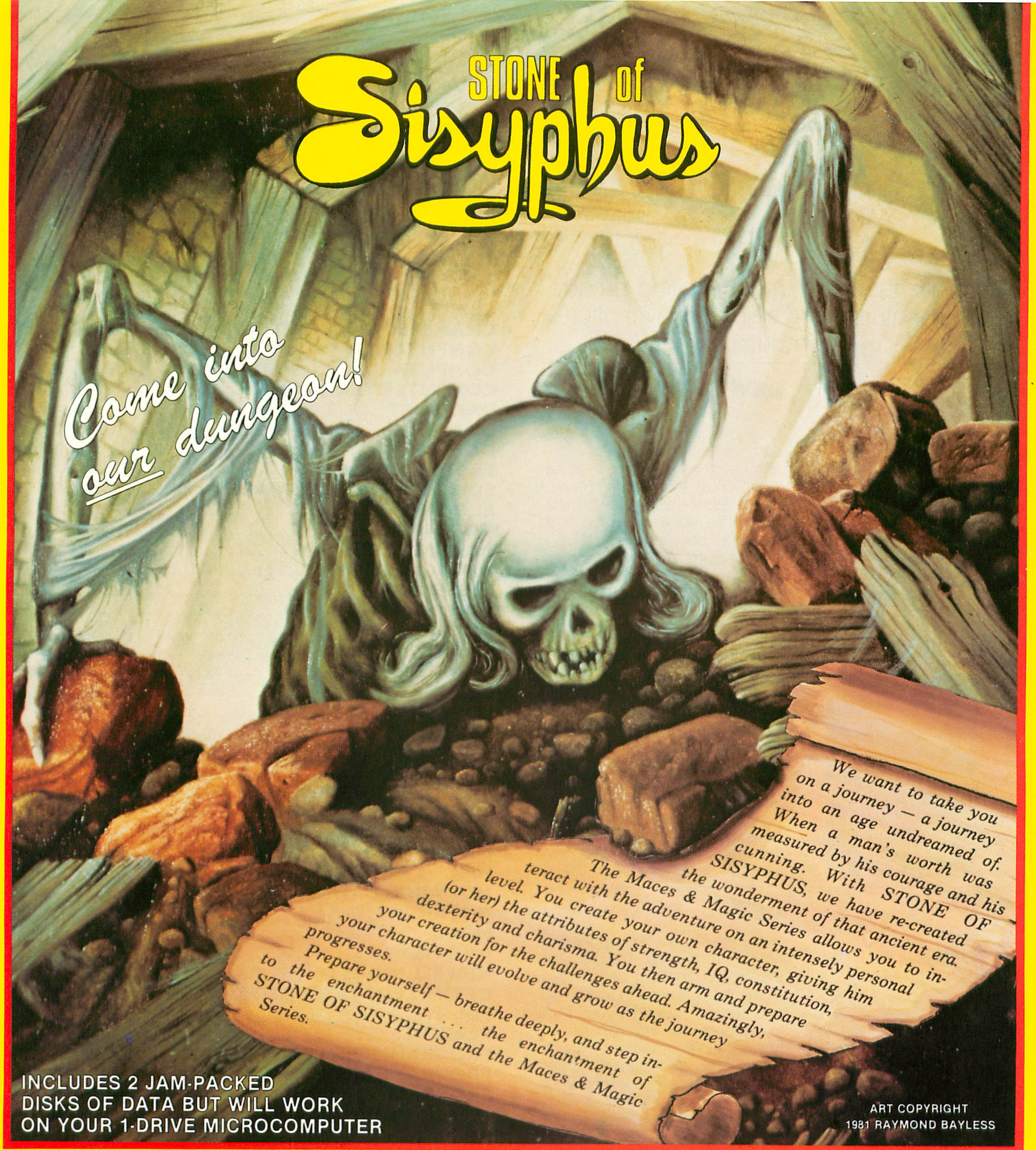
Requires Music Composer Cartridge

1. Prelude
2. Joplin
3. In My Life
4. Work Week
5. Star Trek
6. Daisy
7. Moon River
8. Greensleeves
9. Yellow Submarine, and many more

ANTIC PHOTO GRAPHICS

Digitized Photos

ANTIC presents these programs in diskette form for the convenience of the ATARI community, in the belief that all of the programs offered are in the Public Domain and that no proprietary interests or rights to these programs are claimed by anyone. These diskettes are not copyprotected, nor does ANTIC claim rights to the programs themselves. The price of the diskettes is based on the cost of making them available.


STONE of
Sisyphus
Come into our dungeon!
We want to take you on a journey — a journey into an age undreamed of. When a man's worth was measured by his courage and his cunning. With STONE OF SISYPHUS, we have re-created the wonderment of that ancient era.
The Maces & Magic Series allows you to interact with the adventure on an intensely personal level. You create your own character, giving him (or her) the attributes of strength, IQ, constitution, dexterity and charisma. You then arm and prepare your creation for the challenges ahead. Amazingly, your character will evolve and grow as the journey progresses.
Prepare yourself — breathe deeply, and step in to the enchantment . . . the enchantment of STONE OF SISYPHUS and the Maces & Magic Series.
INCLUDES 2 JAM-PACKED
DISKS OF DATA BUT WILL WORK
ON YOUR 1-DRIVE MICROCOMPUTER
ART COPYRIGHT
1981 RAYMOND BAYLESS

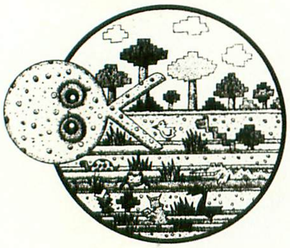

STOP!! PAY TROLL!!
Says the sign over the approach to a bridge over a small canyon.
A sleepy troll lounges in front of a shelter hut. You may pay the troll to cross the bridge (1 treasure from your pack) (1), cross by force (2), or follow the passage to the W (3).


You are in the lair of a manticore.
Scattered about the lair are old monsterette magazines.
Some of the pictures have been stuck to the walls.
The manticore himself approaches.
You may engage him (1), or leave (2).
?

NEW ADVENTURE
ARCADE CHALLENGERS

Here are the latest, most exciting arcade and adventure games PDI has ever offered ATARI® computer owners!

SWAMP CHOMP



NEW

Life in the Muckedoo Swamp is tough. Alligators, snapping turtles, vampire bats and even ghosts—all try to eat you, a hungry defenseless Gorx. If only you can make it to the feeder station and metamorphose, you'll show them what a swamp chomper can do! One or two players. 24K Disk & Joystick/ 16K Cassette & Joystick.

MOONBASE IO



Most Innovative Game of 1982
(Electronic Games Magazine)

Moonbase Io is a winner every way. It's a voice-activated arcade game with three very different adventure settings. 1) Navigate the alien mine field. 2) Defend Moonbase Io. 3) Attack & destroy mother ship. If you win, you get a personal Presidential commendation from Earth! Seven levels of difficulty. Sensational graphics. 24K Disk, Cassette & Joystick/16K Cassette & Joystick.

Clipper

(Around The Horn in 1850)



NEW

You're the captain of a clipper ship bound from New York to San Francisco, with lots of decisions to make. You pick vessel, cargo, crew and course. Then use your skills to overcome storms, icebergs, illness, delays, doldrums, mutiny and more! Voice-narrated, this high adventure challenges your brain and navigation skills. 32K Disk, Cassette & Joystick/24K Cassette & Joystick.

Available at leading stores or direct from PDI.

PDI

Program Design, Inc. 11 Idar Court, Greenwich, CT 06830

OUR GAMES ARE WORLDS APART FROM THE ORDINARY.



Games for the Apple and Atari computers.

Gamesters everywhere are discovering the many worlds of Brøderbund's Apple and Atari programs, and they're not going back to anything less. Because Brøderbund's entertainment software offers pleasures and perils found nowhere else in the galaxy.

Only Brøderbund can take you on a desperate rescue mission aboard CHOPLIFTER, then give you a fast lesson in train robbing with TRACK ATTACK. Next, try battling the metamorphic maze and slithery monsters found only in SERPENTINE and LABYRINTH. Or enjoy the lively pinball action of DAVID'S MIDNIGHT MAGIC. Trouble shooters will find plenty of targets with STAR BLAZER, while DUELING DIGITS will put your mind and reflexes to their ultimate test.

So next time you're looking for new worlds to conquer, remember Brøderbund. You'll find the experience most extraordinary.

Call or write for our free catalog.

Brøderbund Software

Brøderbund products are available at your retailer or by writing to:
Brøderbund Software, Inc., 1938 Fourth Street, San Rafael, CA 94901, Tel: (415) 456-6424


Why let some good times slip through your fingers?
Corner the latest Synapse Software games at your local computer store.
DRELBS
SLAMBALL
Available in disk, cassette, and cartridge for the Atari 400/800 computers.
Other titles soon available for the VIC 64, IBM-PC and the TI 99/4.
Atari is a registered trademark of Atari, Inc.
VIC 64 is a registered trademark of Commodore, Inc.
IBM-PC is a registered trademark of IBM, Inc.
TI 99/4 is a registered trademark of Texas Instruments, Inc.
All game titles are trademarks of Synapse Software.
synapse
SOFTWARE
5221 Central Avenue, Richmond, CA 94804